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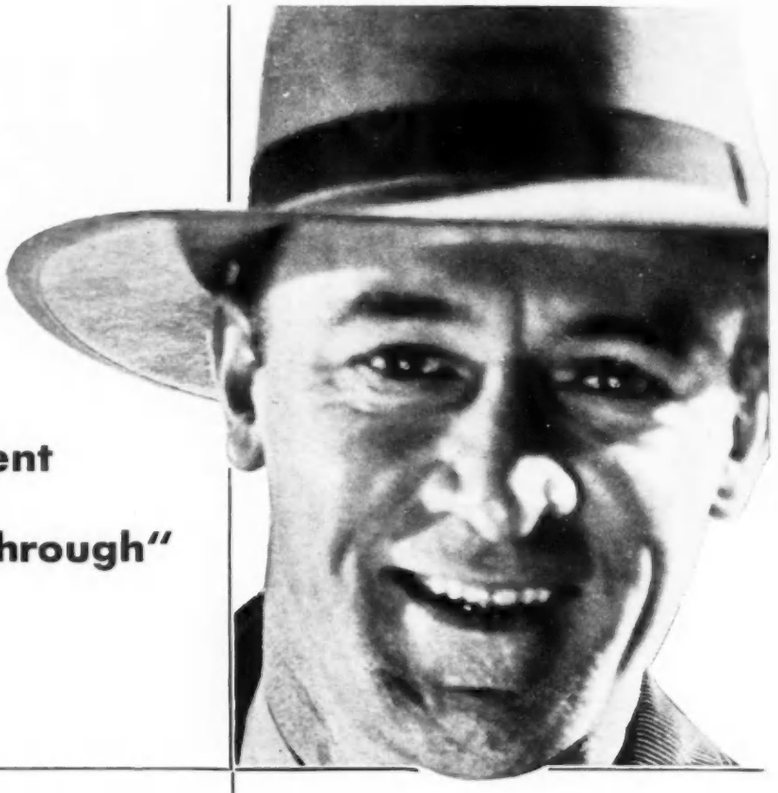

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LOOKING AHEAD
... with the Editor

ALTHOUGH Peru has been listed in the world's oil producing columns since 1884, antedating all other countries in South America in that respect, its isolation has precluded extensive development or exploration. For the past 30 years production there has varied from 30,000 to 45,000 barrels per day, always with a substantial exportable surplus.

The Peruvian government has been an important factor in producing operations for the past 15 years and since 1942, under the stimulus of wartime demand, has nearly doubled its oil production. The government is also wildcatting in several areas.

The huge inland empire of Peru lies only 200 to 1000 miles from the West Coast, but is separated from it by a mountain range which passes 12,000 to 15,000 feet high with peaks rising 15,000 to 20,000 feet above sea level.

J. Elmer Thomas, Fort Worth, consulting geologist, who has recently returned from South America, has written an interesting discussion of the situation in Peru. It will appear in the monthly International Section of next week's issue of THE OIL WEEKLY.

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The Outlook

A number of moves are being considered by administration leaders to counteract the effects of the Pauley-Ickes blow-up before the summer's congressional campaigns. In an effort to smother the episode with good deeds, legislation will be pressed which is designed to obtain the approbation of every segment of the population that can be reached. Time will not permit enactment of most of these measures and the appeal will be made to keep democratic members in office to push them through.

* * * *

An international conference on the conservation of natural resources depleted by war requirements is being considered. In the case of oil it is probable that the suggestion will be made that conservation of United States resources can be accomplished best through imports, and if the conference is arranged it will be preceded by a broad program to sell the country, other than the oil industry, on the necessity for such action.

* * * *

The Iraq government reportedly is preparing to build a refinery to break the marketing monopoly of Iraq Petroleum Company, but there is some question whether the idea may not have been broached with a view toward gaining better terms under the company's concession, similar to the move made some 15 years ago to the same end.

* * * *

The nation is starting anew toward peacetime prosperity, with the past six months a dead loss and as much uncertainty as ever over the administration's long-range policies. With legislation on price control, housing, minimum wages and other important matters moving through Congress at a snail's pace, many industries will be cautious in their return to the postwar market until they can see whether the administration has any more cost increases that they will be expected to absorb.

* * * *

Declining interest rates and accompanying inflationary tendencies are creating new uncertainties in industry. While the former have made recent industrial financing possible at an unprecedentedly low cost, financial experts are apprehensive because continuance of the government's policy of financing the war on a low and stable level of interest rates may bring about expansion of credit and purchasing power at a time when goods are scarce and control of inflation is a main problem.

* * * *

Analysis of the "full employment bill" as finally enacted by Congress reveals that it will do little of what was projected by its sponsors when it was introduced. Instead of a guarantee of employment, the bill calls for the maintenance of conditions which will encourage free, competitive enterprise to provide an adequate job volume, and leaves to the President and Congress little more than the responsibility for making reports and suggestions to that end.

* * * *

Leasing by both majors and independents continues active in Kansas and Oklahoma. Much of the acreage acquired last year is undergoing intensive scientific seismological and geological study and prospects are good for extremely interesting new developments.

* * * *

While steel shortages are being felt by the oil industry, operators and landowners are getting together in agreeing to a voluntary slowdown where shortages are most acute. However, actual drilling volume has remained about normal for the season.

* * * *

A bill before the Mississippi legislature provides in general for expiration of oil, gas and mineral rights in 10 years in the absence of development, with certain qualifications.

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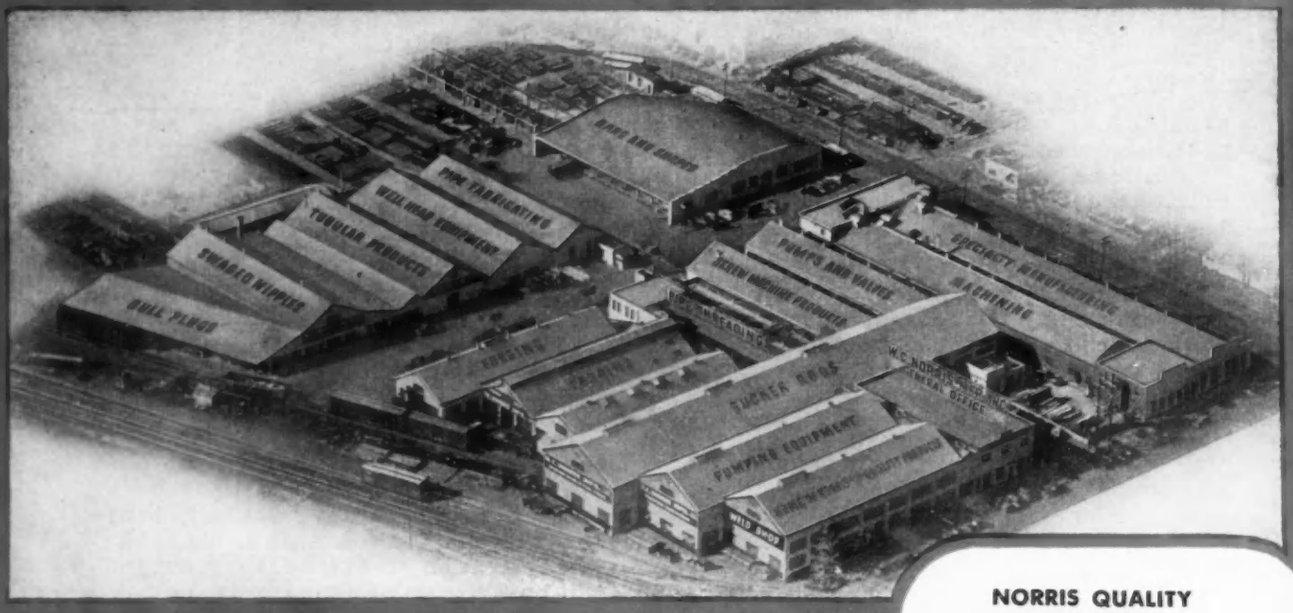

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The Changing Panorama

Up Goes Prices—Now How About Oil?

THE government's new policy is to approve wage increases of 15 to 18 percent, and it now promises to allow price increases where necessary. How will the oil industry fare under this new policy? Most of the refineries seized by the government last September have been released, and the wage increases have averaged about 18½ percent, or 26 cents per hour.

During the war, the oil industry "took it on the chin" as far as any price increases were concerned. The pressure was great on the independent segment of the industry, especially, and many companies in this category lost money on their operations. With wages and materials costing more, the price of crude remained fixed, and the squeeze was pronounced.

Senator Elmer Thomas of Oklahoma estimates that oil operators in his state lost $190,658,000, while royalty owners and others, including the state itself, are poorer by some $206,716,000, due to the static price of crude.

If the industry is to continue in a progressive, healthy condition, the price of crude within the United States must be such as to encourage the exploration for and development of new flush production, to preserve wells of small production, and to encourage secondary-recovery operations. These developments are vital to the nation's welfare.

These requirements are not being promoted by the present crude price, and the subsidy payments now being made by the government on stripper-well production, while helpful, are not generally considered the proper approach to the problem.

It remains to be seen just how much longer the industry will tolerate this situation. There is indication that oil men in a good many parts of the country feel that the limit of patience has about been reached, that price relief should be granted to the oil business along with other basic industries of the nation. It has been pointed out that a crude price increase at this time would by no means constitute inflation. On the contrary it would mean that the oil industry is beginning to catch up with the inflation which has already taken place.

There was no shortage of oil during the war—there is none now, thanks to the industry which is among the most stable in the nation. However, many operators cannot go on much longer without some upward adjustment of crude prices. They cannot continue to search for new oil at present prices, which means a future shortage.

New Twist Given Pollution Litigation

A SALT water pollution suit has been filed in an Oklahoma court charging several oil companies with "polluting the highways" and thus providing a new twist to this type of litigation. The problem of salt water disposal has always been a vexing one. Ever since oil was discovered farmers have been suing oil men for damage to lands and crops; municipalities have been complaining of pollution to public drinking water supplies. But it remained for an Oilton, Oklahoma, school teacher to think up a new grievance.

In his suit against the oil companies the school teacher sets forth that his work requires him to travel over a highway north of Oilton and he complains that the defendents have been negligent in permitting salt water and chemicals from their wells to flow across the highways, thus ruining his automobile. He asks $800 for damages to his car.

Leaving the case to be decided upon its merits, it is appropriate here to state that oil companies and independent oil operators have been doing a fine job of preventing pollution to lands which they have leased and to adjoining lands as well. Salt water disposal is big business in the oil industry and one engineer estimates that the oil companies are spending close to $100,000 a month in salt-water-disposal projects. This phase of oil production has by no means received the credit it so justly merits. It is to be hoped that the trial judge when he hears the evidence in the case of the "polluted highways" will take into consideration the fine work done by company engineers and the large sums of money that are being spent to prevent polution from excess salt water.

Research is a process of finding out what you are going to do when you can't keep on doing what you are doing now. The fellow who says, "I'll be damned if I know"—he needs research.

—CHARLES F. KETTERING, vice president, General Motors Corporation.

Russian Exports of Petroleum Unlikely

ALTHOUGH the new recently announced USSR plan calls for a 50 percent increase in crude oil production by the end of another five years, it appears unlikely that Russia will become a large petroleum exporting nation.

Other phases of the same new five-year plan presage an equally sharp gain in consuming rates.

If the petroleum goal is achieved USSR will be producing in excess of 1,200,000 barrels by 1951. This would be twice as much as Russia's 1938 production of 561,000 barrels daily, and would compare with its current output of about 820,000 barrels per day. The scheduled 1951 production rate would be considerably above California's daily output, for the two now are producing about the same amounts.

Crude production of Russia prior to the war expanded sharply, but so did industrial capacity and the country never exported large quantities. During the war, Russia's crude production increased more sharply but not sufficiently to meet military requirements for petroleum, and the United States shipped 7¼ million barrels under lend-lease during the four-year period following October, 1941. This was an average of 5000 barrels daily.

The new five-year plan clearly indicates that the USSR will consume larger quantities of petroleum, for Stalin stressed the fact that industrial expansion was to be the most important phase of the new program. Hence, Russia is likely to consume the additional quantities of petroleum she expects to produce during the next five years.

Fears Patent Bill

FEAR that the unlawful confiscation of patent property is provided in a bill introduced by Representative Frank W. Boykin of Alabama has been expressed by R. J. Dearborn, chairman of the committee on patents of the National Association of Manufacturers. The bill, H. R. 5223, known as the Patent Priority Bill, would relieve inventors of some of the hardships occasioned by the war in connection with the filing and the prosecution of applications for a patent. It has been reported out by the House Committee on Patents.

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The Week's News

CHANCES of Edwin W. Pauley for confirmation as Undersecretary of the Navy continued to seesaw last week but at the weekend were regarded as lower than before, despite President Truman's repeated assertion of his support and confidence, largely as the result of a break in the ranks of the Southern block which heretofore has been following the President. Page 12.

Ickes' Successor—Speculation over who will succeed Harold L. Ickes as Secretary of the Interior continued high as the President indicated that Supreme Court Associate Justice William Orville Douglas, considered the leading contender for the post, was out. If true, this will make easier the work of the court, already short one man through the absence of Associate Justice Robert H. Jackson as Nazi prosecutor. Page 12.

SPA Plan Criticized—Industry's opposition to the Surplus Property Administrations reports on the disposal of government-owned pipe lines and refinery facilities continued to mount, with a challenge of its recommendations on refineries reaching Chairman O'Mahoney of the Special Senate Petroleum Committee from the Subcommittee on Postwar Disposal of Refineries and Related Facilities. Page 14.

Mother Hubbard Suit—The machinery for the trial of the government's "Mother Hubbard" suit against the oil industry got under way last week when May 20 was set by the District of Columbia Federal Court for answers, pleadings and motions of the defendants. Page 16.

Price Control Discussion—Several weeks of discussion of price control were opened by the House Banking and Currency Committee, with Administrator Chester Bowles pleading for extension of the law for another year without amendment. The oil industry's views on crude prices and control will be given the first week of March. Story below.

Land Back to States—The tidelands resolution is only one of several measures pending in Congress with more to come, returning to the states large acreages which the federal government either claims or owns. A very definite movement is under way to oust the government from its position as the greatest landowner in the country. Page 13.

Strike Situation—The world's two biggest rock bit plants at Houston were operating with part forces although no settlement has been made with the striking unions. Page 16.

FPC Gas Hearing—Indiana, Illinois, Minnesota and other midwestern states tell FPC at Chicago that they want gas with no restrictions on transportation or end use. Page 13.

Lend Lease Totals—Uncle Sam's lend-lease credits likely will total more than 300 million barrels valued at $2075 million. Story below.

1943 Gas Reports—Corporations engaged in the production of crude oil and natural gas paid income and excess profits taxes of $34,518,000 in 1944 on gross 1943 receipts of $704,-700,000, it was reported February 24 by the Treasury Department.

Texas Allowable Cut—For fear present production rates will lead to a cut in crude prices, the Texas Railroad Commission last week whacked the March allowable to 1,791,553 barrels. Page 15.

Total Petroleum Lend-Lease Likely To Exceed 300 Million Barrels

Figures being compiled by the Department of Commerce from wartime records will show that more than 2 million barrels of crude oil, 95 million barrels of aviation gasoline, 90 million barrels of motor fuel, 15 million barrels of kerosine and many million barrels of lubricating oils and other products were shipped to the United Kingdom under lend-lease.

When complete statistics are available, it is expected that total lend-lease oil shipments to all countries will be found to have exceeded 300 million barrels, and $2075 million in value.

Because of the many types of lubricating oils recorded separately and the diversity of less-important products, figures for those items cannot now readily be assembled, but data on the shipments of crude, aviation and motor fuel and kerosine are possible of compilation.

From the initiation of lend-lease in 1941 through September, 1945, petroleum shipments to the United Kingdom had a value of $1,530,307,000 and included 2,286,056 barrels of crude oil, 75,-529,223 barrels of aviation gasoline over 87 octane, 19,518,408 barrels of lower octane aviation gasoline, 65,771,187 barrels of motor fuel 80 octane or over, 24,561,-189 barrels of lower octane motor fuel and gasoline, and 14,967,169 barrels of kerosine.

For the same period, shipments to Russia had a value of $111,075,000 and included 5,298,348 barrels of high-octane aviation fuel, 149,641 barrels of lower octane aviation fuel, 168,393 barrels of high-octane motor fuel, 1,530,909 barrels of lower octane motor fuel and gasoline and 95,991 barrels of kerosine.

Australia, with shipments valued at $136,721,000, received 10,063,734 barrels of high-octane aviation gasoline, 3,479,-352 barrels of lower octane aviation gasoline, 476,314 barrels of high-octane motor fuel, 433,777 barrels of lower octane motor fuel, and 238,513 barrels of kerosine.

Shipments to Canada included 3,191,-575 barrels of crude oil, 125,219 barrels of high-octane and 144,941 barrels of medium octane aviation gasoline, 256,201 barrels of regular motor fuel and gasoline and 81,099 barrels of kerosine.

Other shipments of high-octane aviation gasoline included 5,897,299 barrels to Egypt, 3,426,041 barrels to India, 10,-979,273 barrels to Ceylon, 1,897,838 barrels to New Guinea and 326,328 barrels to New Zealand, which also received 878,602 barrels of medium octane aviation fuel. Smaller quantities of aviation gasoline, motor fuel and lubricants were made to a wide range of other countries as war activities spread, and after the close of the war considerable oil was shipped to France.

Oil Price Control Before Committee Early in March

The next few months will tell whether the United States goes boom or bust, the House Banking and Currency Committee was told February 18 by Price Administrator Chester Bowles as it opened hearings on legislation to continue the price control act until June 30, 1947. The question of oil-price control likely will not be reached before the week of March 4.

Bowles told the committee that "every where men are betting on inflation," that speculation and hoarding are rampant, and it is now apparent the government had moved too fast in wiping out the wartime control structure, making it necessary to restore some of the material-control regulations.

Pointing out that corporations profits for 1945, before taxes, are expected to total some $22 billion compared with a little less than $25 billion in 1944, he said, "Only 15 percent of American industry is affected materially by the transition from war to peace. Its prospects, in general, were never brighter. In 1945 bankruptcies fell for the third successive year to an all-time low of 810. This compares to 22,900 bankruptcies in the boom year 1929."

Recognizing the sentiment in Congress for limitations upon the authority of the OPA, Bowles pleaded with the committee to extend the stabilization law "without amendment and at the earliest possible moment."

"The speculative fever in this country has reached such a pitch that it can be overcome only if it is unquestionably

clear to everybody that the Congress, no less than the executive branch of the Government, is determined that inflation shall not come. Delay in reaching a decision will do irreparable damage to the entire program."

Douglas Considered Leading Candidate for Ickes' Post

President Truman posed a problem at his news conference February 21, saying first that he could not have two cabinet members from the same state, later amending it to say he did not think he should do so, but refusing to state whether that put Associate Justice William O. Douglas out of the running as a successor to Harold L. Ickes as Secretary of the Interior.

Douglas' legal residence is Washington, from which state also comes Secretary of Labor Lewis B. Schwellenbach. The President, when asked, said Schwellenbach could stay in the cabinet as long as he desired.

(But the President already has two men from the same state in his cabinet—Secretaries of War Robert P. Patterson and Navy James Forrestal of New York.)

Truman said he talked to Douglas about the post but that he had made no decision.

The disinclination to have two cabinet members from the state was seen as ruling out Governor and former Senator Mon C. Wallgren of Washington, who also had been spoken of as a possible successor to Ickes.

Douglas, the youngest member of the Supreme Court, has important Democratic support for the Interior Department post, which might be a good springboard from which to jump into a presidential campaign as candidate, should the lightning strike.

Scientists to Appear at Next Compact Gathering

Several scientists will appear on the program of the spring meeting of the Interstate Oil Compact Commission at the Mayo Hotel, Tulsa, April 11-13. Dr. E. R. Weidlein, director of the Mellon Institute, Pittsburgh, will address the open session, April 13, on developments in industrial research during the war. Other addresses are to be announced.

Fuel Oils Upped

A temporary increase of ¾ cent per gallon on kerosine and Pacific specification 100 and 200 fuel oils in Washington, Oregon, Nevada, California, Arizona and Hawaii was announced by the Office of Price Administration February 20 in an effort to increase the supply of those products on the Pacific Coast during the next few months. The increase would run until next June 30.

If the increase in price does not result in the necessary diversion of production to kerosine and distillate fuel oils, OPA said, "other measures" will be taken, including possibly a reduction in gasoline prices.

Pauley Believed to Have Lost Ground As Senate Committee Hearings Recess

The Senate Naval Affairs Committee, hearing testimony relating to Edwin W. Pauley's nomination as Undersecretary of the Navy had recessed over the weekend until February 26 when T. S. Petersen, vice president of Standard Oil Company of California, H. D. Collier, member of the board of the same company and Vic Rosetti, president of Farmers and Merchants Bank of Los Angeles are slated to testify. Observers thought Pauley lost ground during the week.

Solid South Breaks

The week was a stormy one for the committee. A Tennessee Senator (Tom Stewart) suggested that Pauley withdraw, to save embarrassment for the President and Robert E. Hannegan, but President Truman again came to his nominee's aid, reiterating at a press conference his faith in Pauley and declaring again that he would not withdraw the name. Several House members, which will have no voice in passing on Pauley, also criticized the nomination.

Pauley denied that Hannegan had ever been connected with any oil venture in which he (Pauley) was interested.

Harold Judson, assistant solicitor general in the Department of Justice, told of work he did for oil companies in 1939 with respect to $380,500 contributed in the referendum fight over the California oil conservation law. He said he was engaged by H. J. March of Signal Oil and Gas Company to do the work.

Senator Charles W. Tobey, spearhead of the Pauley attack, told of a "leak" of details of a conversation in his office with two Standard Oil officials which reached March. March, on the stand, denied the story.

During cross-examination on the question of the sale of oil to Japan by The Petrol Corporation, Pauley, more belligerent than during his earlier testimony, told the committee that his company never sold directly to Japan, but that oil was sold to brokers who in turn sold it to Japan and there was no way he could refuse to sell those brokers.

Oil Sales To Japan

"I want to make it clear," he added, "that I put up a constant campaign with the Secretary of the Interior and the President about sales of oil to Japan and lubricants to neutral countries because I felt they were going to Germany."

To bolster his statement he read a telegram dated June 17, 1941 pointing out to former Secretary Ickes the dangers if Japan got into the Netherlands East Indies. Ickes' letter three days later stated that he would take the matter up with President Roosevelt.

Pauley, under prodding from Tobey, testified that he had been told by the State Department that it did not wish sales of oil to Japan halted for fear of antagonizing that government, and threw the matter back into the committee's lap with the assertion that members of the Senate, with responsibilities greater than the average citizen, should have taken steps to halt the sales.

Thus brought under attack himself, Tobey said he had gone to the State Department about the matter and admitted he was told it was government policy to sell to Japan.

In forthright terms, Pauley said that "when" confirmed as Undersecretary of the Navy, he would be glad to disassociate himself entirely from business and would discontinue taking any salary whatever from The Petrol Corporation.

He pointed out that laws designed adequately to preserve the government's oil already are in effect, and declared that members of Congress would be guilty of failure to perform their duty if he could succeed in converting naval oil lands for private or party benefit.

Asked by Senator Owen Brewster whether he thought it entirely coincidental that Judson, former lawyer for California oil interests, became a Department of Justice official just at the time the tidelands suit was filed, Pauley said he had nothing to do with the appointment and was not in Washington when it was made.

Forrestal's Testimony

Secretary of the Navy James Forrestal told the committee he agreed to Pauley's nomination with the understanding the oil man would not become head of the department until he had had at least six month's experience. Forrestal disclaimed any knowledge as to Pauley's fitness for the post, explaining that his contact with him has been limited, and emphasized that he has no personal knowledge or information about the charges against the President's nominee.

Forrestal told the committee that the Navy believes the issue of tidelands ownership is one for decision by the Supreme Court.

He made it clear that oil matters in his department are handled by the office of Assistant Secretary John L. Sullivan and he does not propose to disturb that allocation.

"At no time has Pauley brought pressure on behalf of any individual or interest so far as Navy business, contracts or personnel are concerned," he declared.

Fortas Can't Recall

Former Undersecretary of the Interior Abe Fortas, called to substantiate Ickes' testimony regarding a meeting in his office at which Ickes said Pauley told him $300,000 or more could be raised from California oil men for the campaign fund if the tidelands suit was not filed, testified that he heard Pauley discuss with Ickes campaign contributions and the tidelands suit but that he could not remember whether the two subjects were linked together.

TEXAS COMPANY MAN HONORED

Lt. Col. Harry H. Arnold, Jr. (center), general superintendent of the Illinois-Indiana-Western Kentucky district of the producing department, The Texas Company, received recently at Salem, Ill., the Legion of Merit for outstanding performance with the Corps of Engineers, U. S. Army. The award was presented by Col. Ford J. Lauer, deputy commander, Scott Field, Ill., in the Presence of A. R. Wilson (right), assistant to the managing-producing department, Houston, and Harold V. Pardee (left), manager of the Oklahoma-Kansas-Illinois division, Tulsa.

Midwestern Witnesses Tell FPC "We Want Gas" at Chicago Hearing

We want gas!

This, in substance, is what the Federal Power Commission has been told by the gas-consuming states of the Middle West during the first few days of the initial gas consuming area hearings of its natural gas investigation in Chicago.

A new issue raised by spokesmen for the states in the areas is direct control of industrial sales. Indiana and Illinois have made it plain they believe direct industrial sales should be regulated—preferably by the states, but if this is outside of state control, that the FPC should be given authority.

Witnesses from Minnesota, Indiana, Illinois, and Iowa, during the first three days of the hearing, emphasized that they do not want restrictions on the exportation or end use of natural gas; that they need natural gas for the economic development of their respective states, and that a federal agency should not attempt to set up trade barriers or tell the people of the Nation the type of fuel they may or may not use.

An Indiana witness was most pronounced in the determination that direct industrial sales rates should be brought under some kind of control. Indiana has sought to invoke State powers to take jurisdiction over direct industrial sales rates. There is pending a court case on this issue as a result of Indiana's action.

Producing and consuming states of the Middle West differ over the question of prices of natural gas. Throughout the FPC natural gas investigation hearings in the producing sections of the Southwest, there was a demand for a substantial increase in the well-head price of gas. At the consumer hearing in Chicago, witnesses have based their preference for gas partly on the assumption that natural gas retail prices are considerably lower than the retail price of coal or oil.

Industrial Loads Needed

Many witnesses, familiar with the producing and distributing ends of the business, contended that even a doubling of the well-head price in the Southwest sections would not materially necessitate a substantial increase in the retail price of gas. Whether the Midwest consuming areas are satisfied with this contention appears a matter for future settlement. FPC members, do not seem convinced that this contention is tenable. Whether a substantial well-head increase would necessitate a consequential raise in the retail rates and particularly in domestic rates in the consuming areas, seems a matter for decision of the FPC.

The position of Illinois, first to present its case, was stated by Warren Henry, acting chief engineer of the Illinois Commerce Commission, who cited the necessity of heavy industrial loads to provide domestic gas at reasonable rates. This contention was reiterated by spokesmen for all of the other States presenting testimony at the hearing.

Henry said he was proceeding on the theory that supplying gas is an established public utility service and that the public, in areas where gas is held out for public use, is entitled to adequate service under rates not greater than those necessary by the economics of the service. He was the first to assert that all direct industrial sales should be regulated, but did not specify whether the regulation should be by federal or state government.

Lawrence Cannon, member of the Public Service Commission of Indiana, pointed up the issue of control of direct sales. He emphasized that the people of Indiana want all the natural gas possible.

"We believe," he said, "that Congress has left with each state the control and regulation of direct sales to consumers within such state."

Various spokesmen for industries and communities in all of the consuming states presenting testimony, asserted there is no reason for anyone to restrict the amount of gas imported to any area or to restrict the use to which that gas is put. They asserted that it should be left to the consumer to determine whether he wanted gas or some other fuel, and that competition should be the only arbiter deciding whether an individual or enterprise used gas or other fuel.

Oppose Restrictions

Spokesmen for Minnesota communities made the most vigorous arguments against restriction of end use of natural gas. St. Paul and Minneapolis witnesses presented a strong case designed to show that any restriction on the use of natural gas would retard progres in their communities. St. Paul made a stronger bid on this score, as that city does not have natural gas, but is desirous of obtaining it as soon as local law permits. Spokesmen for St. Paul contended that it was primarily because natural gas is available to Minneapolis and not to St. Paul that the former city has made greater industrial strides than the latter.

A parade of witnesses from small communities in Minnesota presented resolutions adopted by their respective city councils opposing any restriction on the use of natural gas; contending that any such restriction would retard their industrial developments and cause great expense to cities because of their present dependence on natural gas.

Coming somewhat as a surprise was presentation of resolutions adopted by several union groups in Minnesota towns urging that there be no restriction on the importation or use of natural gas.

Early Move to Return War Lands to States Seen

There is a spreading move in Congress to restore to the states much of the hundreds of millions of acres of land accumulated by the government.

The resolution for relinquishment of federal claims to the tidelands is only one of several measures pending in Congress to return lands for which the government has no definite use, including bills by Senator Carl A. Hatch of New Mexico which would grant to his state some 10 million acres of public lands for the use and benefit of its public institutions, and by Senator Pat McCarran of Nevada which would make a similar grant of 12 million acres to his state.

A flood of similar bills may be expected from members of other western states.

It is possible that the subject soon will be given serious consideration.

Pumping Units Being Added To Gulf's West Texas Line

Gulf Refining Company, pipe line division, is building foundations for the installation of an additional pumping unit at the 11 stations on its West Texas-Port Arthur 10-inch sweet-crude carrier.

The pumping units, consisting of 750 HP Diesel-powered centrifugal pumps, rated at 40,000 barrels daily capacity each, will begin arriving mid-April. Installations at 6 stations between Midland and Weatherford, where connection is made with its mid-continent system will be completed in order to boost the capacity of its double 10-inch outlet from the Permian Basin from 99,000 to 117,000 barrels daily.

However, an average of 8000 barrels daily of mixed crude is diverted to the company's refinery at Sweetwater, situated midway between Midland and Weatherford. The company's Permian Basin sour-oil stream is divided at Weatherford, with a portion moving via a multi-unit system and parallel to the sweet-oil carrier through Wortham and the remainder routed via Fort Worth and Saltillo, East Texas thence south to Port Aruthr.

The new station units will conclude Gulf's $7 million looping program out of the Permian Basin that was started early last year. It will have the largest basin outlet when the equipment goes into service.

North Texas Group Will Discuss Secondary Recovery

North Texas Oil and Gas Association at its convention March 2, in the Kemp Hotel, Wichita Falls, Texas, will discuss best procedures to follow in collecting and disseminating information to Texas producers on secondary recovery in North Texas. During the past month, the Association has been endeavoring to develop ways and means of stimulating more interest in the possibilities of further operations of this character.

The meeting will be attended by representatives from the United States Bureau of Mines station at Bartlesville, Okla., also from the Pennsylvania Grade Crude Oil Association, at Bradford, Penn.

The meeting will be concluded with a banquet in the evening, at which B. A. Hardey, president of IPAA, H. M. McClure, president of National Stripper Well Association, and Dr. Richard J. Gonzalez, economist for Humble Oil & Refining Company, will speak. United States Congressman, Ed Gossett, also will appear on the program.

AIME to Meet

The North Texas section of AIME will meet Tuesday, February 26, in the Adolphus Hotel, Dallas. A. G. Wolf of the Texas Sulphur Company will speak on "The Gulf Coast Sulphur Industry." Plans for the national meeting in Chicago will be discussed.

Report on Disposal of Surplus U. S. Refineries Criticized by Committee

Findings of the Surplus Property Administration with respect to the disposal of government refinery facilities were challenged last week by Hines H. Baker, of Houston, chairman of the Subcommittee on Postwar Disposal of Refineries and Related Facilities, in a letter to Senator Joseph C. O'Mahoney chairman of the Special Senate Petroleum Committee.

The SPA report, Baker charged, contains "erroneous assumptions, confusing analyses, and unwarranted and unsound conclusions," particularly with respect to the effect of accelerated depreciation under certificates of necessity and the contention of the SPA that the cost of privately-owned facilities has been substantially written off.

As a matter of fact, he said, the cost of a $14 million privately owned plant under accelerated depreciation is brought down only to $9,934,000, whereas a government plant of the same cost can be halved by an allowance of $4 million for excess wartime cost, and three years' depreciation at 10 percent a year.

Discussing dispositions of plants, Baker said the establishment of 70 percent of original cost as the value upon which to base rentals is not objectionable, but the proposed annual rental of one-twentieth of such value is not fair to the government or owners of privately owned facilities, the annual rental amounting to only half of the normal rate of depreciation applicable to such facilities.

"Such liberal lease terms in conjunction with the determination of value in use from operations will not create incentive to purchase, and preclude all likelihood of sale of facilities to lessee at a fair price to government," he warned. "Such terms involving no capital risk on the part of a lessee will serve only to prolong liberal lease arrangements, thereby imposing unfair competitive conditions upon other units in industry—especially the small, independent operators who must build such facilities to meet quality competition."

Baker also objected to the SPA's assertion that "not only must the price of the unit approximate use value to the purchaser, but also that the period and terms of payment must be suitable to his financial status" in selling plants.

"This sentence can be interpreted to mean that the SPA believes that property should be sold under terms and conditions based on the purchaser's ability to pay," Baker asserted. "Nothing would more adversely affect the American system of free competition than the adoption of such policy. The prospective purchaser who is without adequate funds to finance the purchase of a government-owned facility on terms that assure full payment of a fair price within a reasonable length of time should not look to government for better terms than those extended a competitor who has adequtae funds; and government should not offer terms that discourage any effort on the part of prospective purchaser to make adequate financial arrangements."

Travel Space for U. S. Business Men

Agreement has been reached with the State Department under which 25 percent of the passenger accomodations allocated by the War Department for civilian use will be turned over to the Department of Commerce for businessmen. Planes or ships to return from Europe or to or from India, Africa, the Middle East and the Far East are included.

Credentials will be issued to businessmen filing applications, copies of which will be mailed direct to the mission or consulate where they expect to present themselves to get return passage.

"The department will give travel preference to businessmen whose travel will be most effective in expanding exports and imports, in increasing employment in the United States, in speeding shipments of scarce materials and merchandise, and in assisting American concerns to arrange contracts with foreign nationals who will act as their sales representatives abroad," Alfred Schindler, Undersecretary of Commerce, explained.

Wyoming Map

Oil possibilities of an area of about 3500 square miles in the southeastern part of the Wind River basin and adjacent territory in central Wyoming are shown on a map released by the United States Geological Survey.

The map, based on 1913-14 field work, has been in administrative use in the survey for many years, and was made available to the public because of the current interest in Wyoming.

Titled Preliminary map 51 of the Oil and Gas Investigations series, copies at 50 cents each may be had from the surey in Washington, Casper, Wyoming, Denver or Tulsa.

The survey also released a new geologic map showing the oil and gas possibilities and asphalt deposits in North-Central Gaudalupe County, New Mexico, including three anticlines, one of which has been tested by drilling.

The map was issued as Preliminary Map 44 of the oil and gas investigations series and will be available beginning March 4, at 60 cents per copy, from Washington, Denver or Tulsa.

District 3 Operators Tell Of Conservation Programs

Conclusive evidence that Texas oil and gas operators are aware of the importance of casinghead gas conservation measures was heard at the Railroad Commission meeting for District 3 in Houston, February 20. Extensive plans underway, successful results of programs in operation, and sound conservation principles whole-heartedly supported were revealed.

The meeting followed shortly the Federal Power Commission hearing in Houston on natural gas conservation, in which the state asserted complete ability to conserve its natural gas supply without federal intervention.

High-lights of the meeting were the reports by Rex G. Baker, Humble Oil & Refining Company, and C. G. Condra, Stanolind Oil and Gas Company. Baker said Humble had definite plans involving an expenditure of $4,783,000 for gas conservation in 11 fields in District 3, this in addition to $1,900,000 spent in an earlier program. It will aid in conserving more than 60 million cubic feet per day of casinghead gas.

Condra reported that contract has been let and material, delayed by the steel strike, ordered for a gasoline plant having a capacity of 40,000,000 cubic feet per day in the Hastings Field to utilize 82 percent of the gas produced. Stanolind will spend $4 million in its program.

Representatives of operators who reported to the commission included: O. K. Holman, Texas Gulf Producing Company; Joe Owens, Sun Oil Company; Sidney Miley, Skelly Oil Company; Clyde Dinger, Houston Oil Company; Paul Ward, Ohio Oil Company; Glenn H. McCarthy; G. D. Robertson, Shell Oil Company; C. M. Hinton, The Texas Company; C. V. Millican, Amerada Petroleum Corporation; Charles Langford, Phillips Petroleum Company; Paul Hubbard, Gulf Oil Corporation; Stanley Gill, J. S. Abercrombie Company; E. O. Buck, Rowan Drilling Company, and Travis Smith, royalty owner.

The hearing, presided over by Olin Culberson, commission chairman, also was attended by Commissioned Beauford Jester, and Colonel Ernest O. Thompson.

Foreign Liquidation Office Now Handling Canol Sale

Disposition of the refinery and pipe line built by the Army in connection with its Canol project has been turned over to the Office of the Foreign Liquidation Commissioner of the State Department.

Field offices have been set up by the OFLC in Canada, Newfoundland, Iceland and Greenland to dispose of military surpluses in those areas, under the charge of John W. Clarke, field commissioner.

A special staff has been set up for disposal of Canol with Charles B. Jones of Hinton, W. Va., in charge. Jones was chief engineer with the Corps of Engineers for the Canol project.

Commission Eyes Gasoline Stocks And Cuts Texas March Allowable

In spite of requests from a number of oil companies that there be no cut in sweet crude production during March, the Texas Railroad Commission last week reduced allowables to approximately 350,000 barrels less than February figures.

The commission's order aimed at a daily average crude output for March of 1,791,553 barrels against 2,238,879 for February. Testimony was heard that stocks of gasoline are becoming excessive and that storage will soon be at a premium.

All fields given increased allowables for February were cut back to the January figures. Further reduction was effected by setting 21 general producing days for March, as compared with 24 general producing days in February and 26 in January. The East Texas field was assigned 21 producing days and the Panhandle remains exempt.

The commission previously had heard explanations of the discrepancies between demand estimates of the Bureau of Mines and operators' nominations. Because refiners can make more profit from gasoline sales than they can from other cuts, refining operations are now adjusted to make the largest amount of gasoline possible despite the fact that it must go to storage. For that reason, the demand for crude remains as high now as it was in the fall and early winter, at least so far as the refiners are concerned. The Bureau of Mines, on the other hand, based its estimate on the amount of crude needed for processing to obtain the various quantities of products for which there is a demand.

Refiners explained that recent price increases for kerosine and Diesel oil were insufficient to allow a profit; that large refiners can still make a profit from gasoline sales, although the price has dropped slightly and they have no intention, apparently, of revising their operations to conform to market demand.

The Commissioners noted that national gasoline stocks had risen to 113 million barrels and were still on the upgrade; that the price recently was cut and were fearful that it would decline still further and eventually result in a reduction in the price of crude.

Nominations filed by purchasers totaled 2,307,418 barrels, only 7082 below February. The Bureau of Mines, on the other hand, estimated that the demand amounted to only 1,790,000 barrels a day, 100,000 barrels less than its February estimate and 400,000 barrels below February production.

Resolutions calling for increases in the price of crude oil were introduced. These included requests for removal of price ceilings on both crude and refined products, and increase in the price of crude proportionate to the raises granted labor and other commodities.

Crude Oil Production in the United States

(Estimates compiled by the OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED February 23	February 16
Alabama	950	950
Arkansas	77,350	77,200
California	842,800	844,000
Colorado	23,500	22,800
Florida	100	100
Illinois	211,700	207,200
Indiana	15,700	15,900
Kansas	253,650	259,650
Kentucky	30,300	31,000
Louisiana	368,350	368,500
North Louisiana	79,500	79,800
South Louisiana	288,850	288,700
Michigan	44,350	44,900
Mississippi	52,850	55,100
Missouri	100	100
Montana	19,150	19,300
Nebraska	850	750
New Mexico	98,450	98,400
New York	13,450	13,300
Ohio	6,100	6,800
Oklahoma	390,050	389,450
Pennsylvania	36,150	33,750
Tennessee	35	35
Texas	2,109,800	2,110,100
Upper Gulf Coast	544,000	544,050
East Texas Field	321,600	321,700
Rest of Eastern Texas	145,950	146,000
Southwest Texas	356,100	356,150
West Texas	503,400	503,450
North Texas	157,750	157,700
Panhandle	81,000	81,050
West Virginia	7,300	7,400
Wyoming	100,200	99,500
Total United States	4,703,235	4,706,185

API Production Meets For Spring Announced

District meetings of the Division of Production of the American Petroleum Institute have been listed by Vice President George A. Hill, Jr. of Houston, as follows:

Pacific Coast District—Biltmore Hotel, Los Angeles, April 11-12. B. P. Kantzer, Union Oil Company, Los Angeles, chairman; M. W. Morris, Standard Oil Company of California, program.

Southwestern District — Washington-Youree Hotel, Shreveport, La. May 17-18. W. E. Winn, Sun Oil Company, Dallas, chairman; M. V. Vietti, The Texas Company, Houston, program.

Mid-Continent District—Skirvin Hotel, Oklahoma City, June 6-7. J. S. Montgomery, Oklahoma City, chairman; H. S. Kelly, Phillips Petroleum Company, Bartlesville, program.

Eastern District—William Penn Hotel, Pittsburgh, June 13-14. V. F. Bowyer, Peoples Natural Gas Co., Pittsburgh, chairman; J. F. Swain, Huntley & Huntley, Pittsburgh, program.

With the end of the war attendance and interest in these meetings should surpass any previous ones, Hill said.

Mother Hubbard Suit May Drop API; Next Court Step Scheduled in May

May 20 is the date set by the District of Columbia Federal District court for the filing of answers, pleadings and motions of defendants in the long-dormant "Mother Hubbard" suit against the oil industry.

Within a month or six weeks companies involved in the case likely will indicate whether they are determined to fight it out or will seek a consent decree. When the Department of Justice announced last year that it would revive the suit, there were rumors that the defendants would come into the department promptly in an effort to head off a trial.

Justice Department officials differ as to the desirability of consent decrees, which some lawyers contend usually give the government less than it could obtain by fighting a case to the finish.

There is no chance of its coming to trial before 1947 because of the many preliminary maneuvers probably including a request by the defendants for a bill of particulars.

While department officials spoke of pressing the suit it was rumored that, when the time came, the government might acquiesce in a motion by the API for dismissal of such charges as were leveled against the association.

It was reported that there have been discussions between API representatives and department officials, in which activities of the institute were carefully analyzed and in which, it is understood, the API men emphasized that policies and activities have changed, as a result of wartime conditions, from what they were when the suit was filed in 1940.

Several other defendants are expected to file motions for dismissal of the suit as it applies to them, but practically all of these are expected to be opposed by the government.

If the API is eliminated as a party to the suit, it will be largely due to the firm direction of its activities during the war by President William R. Boyd, Jr., during his service as chairman of the PIWC. That he did not always accomplish this without controversy with his members is no secret, but in the end he always won over the objectors to his plans. As a result, department officials who had been most critical of the institute now are believed to view it in a different light.

Originally filed September 30, 1940, against 22 major oil companies, the suit was suspended during the war at the request of the War and Navy departments. The suit also named many subsidiaries and affiliates of the major companies and American Petroleum Institute.

In reviving the suit, the government dropped Barnsdall Oil Company and 47 miscellaneous subsidiary corporations which have been dissolved since the case was filed.

The government charges that the defendants have conspired to fix and maintain uniform noncompetitive prices for crude purchased from independent producers and for oil sold to independent refiners, restrict the production of crude and products, control transportation and regulate marketing. It alleged that the defendants unlawfully combined to create the API and to utilize it to promote, supervise and enforce the various allegedly illegal policies and practices enumerated.

The suit seeks an injunction against the continuance of these and other practices and the dissolution of the institute.

Rock Bit Plants Operate But Union Continues Strike

With the unions still holding out for wage increases of 18½ cents per hour, the national steel wage pattern, and a number of the strike-bound companies in the Houston area resisting such advances, the general situation in Houston was still pretty much of a deadlock at the week end. As the strike moved into its second month, settlements were reported from three plants in the area, including Sheffield Steel, A. O. Smith Company and Tennessee Coal, Iron and Railroad Company. At these plants about 2150 workmen were involved. Several times this number are on strike at the other nine plants where negotiations are pending.

At Hughes Tool Company, largest manufacturer of oil field rock bits in the nation, operations continued on a three-shift basis made necessary last week by the number of independent union members who have returned to their jobs. Noah Dietrich, executive vice president, declared that the company is willing to negotiate on the basis of Section 3 of President Truman's executive order on the new wage formula which emphasizes that all wage adjustments should take into consideration the wage increase in each plant and the cost of living increase in each community since January, 1941, and that "wage adjustments would vary from industry to industry and firm to firm according to the merits of each situation."

Since January, 1941, Hughes has increased its average hourly rate 20½ cents and offers a further increase of 15 cents, a total of 42 percent which compares with an increase in the cost of living in Houston of 25 percent. At the same time, he continued, Hughes' rate of profit is considerably under the rate it enjoyed in the 1936-39 base period and "we have already requested a price increase in order to adjust earnings to their normal level since we have not had a price increase since 1937."

Hughes feels that is clearly entitled to some price increase without increasing wages, but has offered the union a minimum 15 cents increase in wages "and will apply for compensating price relief." Further wage adjustments would be considered after the price increase petition is acted upon, 30 to 60 days hence. "There is no such thing as a retroactive price increase," Dietrich declared. "The union has consistently refused to bargain on the merits and facts in our case."

Dietrich said that since the strike "we have learned that we can operate more efficiently with fewer employes than before" and indicated 1000 less men might be required to maintain its reduced production for the remainder of 1946.

Reed Roller Bit Company, second largest manufacturer of rock bits, has offered the CIO an immediate raise of 15 cents an hour, payable upon return to work, and has indicated that negotiations for an additional 3½ cents will be opened if the company is granted price relief by OPA. The union's bargaining committee will study this proposal. Reed announced its agreement with Hughes, that wage settlement must be on the basis of conditions at the individual plants. More than 700 of Reed workers have returned to their posts.

Aviation Gasoline Purchases

Defense Supplies Corporation purchased more than $2100 million of aviation gasoline, $890 million of alcohol for the synthetic rubber program and $205 million of molasses for the production of alcohol from 1940 to the end of the war, it was reported February 21 by RFC.

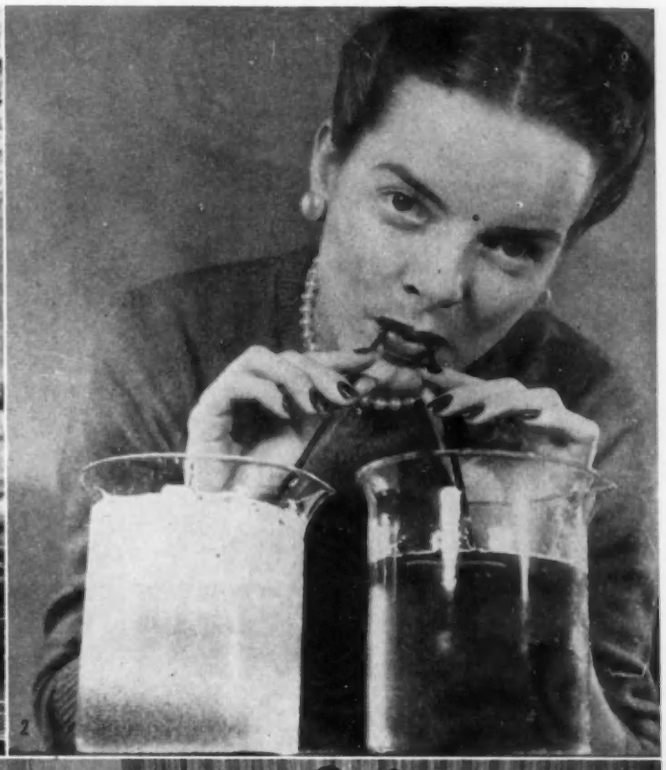
The more than $3 billion spent for these commodities represented well over half of its total purchases of $5800 million of war materials, of which only $139 million remained on hand at the close of last month.

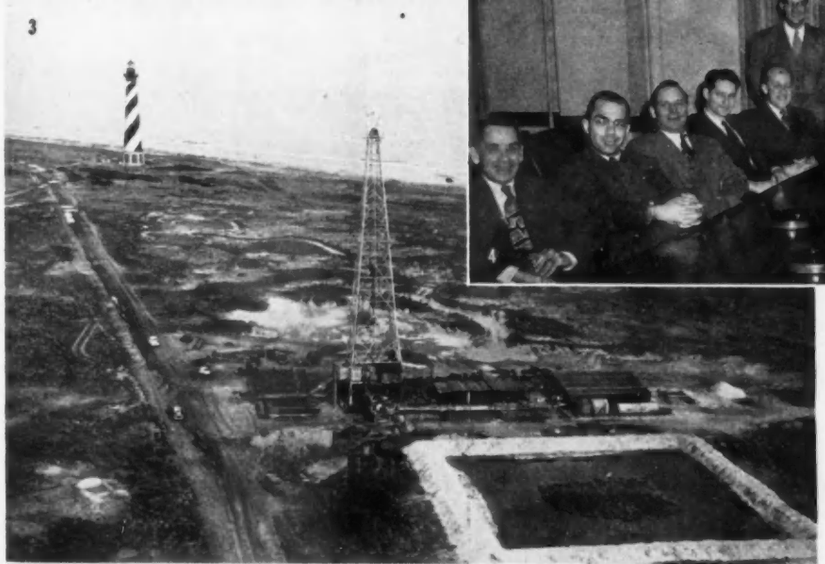
Natural Gas Companies Report

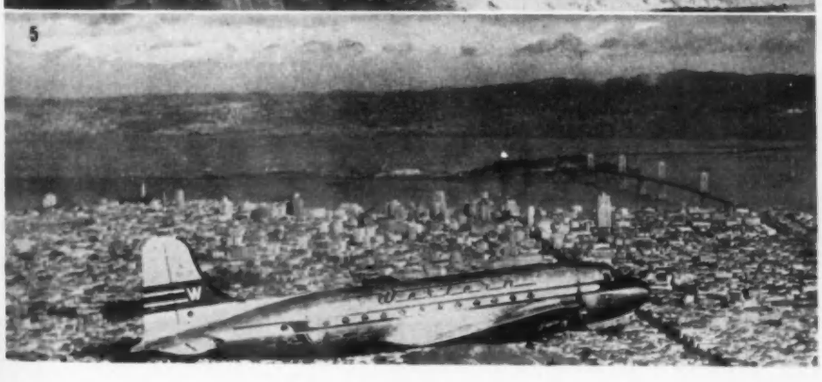
The Federal Power Commission today released a "composite balance sheet" of 116 companies showing that sales of natural gas in 1944 exceeded 2465 billion cubic feet. The companies served 3,676,189 natural gas consumers; natural gas sales were 1,110,605,200,000 cubic feet to ultimate consumers for $304,741,215, and 1,355,753,094,000 cubic feet to other gas utilities for $226,801,410. Exploration and development costs were $7,572,201.

The companies expended $7,948,071 for natural gas production, $6,294,075 for manufactured gas facilities operation and had other production expenses of $190,026,495. Transmission expenses were $40,390,165 and distributing expenses $18,725,737.

They produced 664,501,571,000 cubic feet of natural gas and 19,498,556,000 cubic feet of manufactured gas for mixing with natural, purchased 1,841,738,739,000 cubic feet of natural gas, received 133,549,255,000 cubic feet from others for transportation and had other receipts of 199,390,526,000 cubic feet, a total of 2,858,678,647,000 cubic feet.



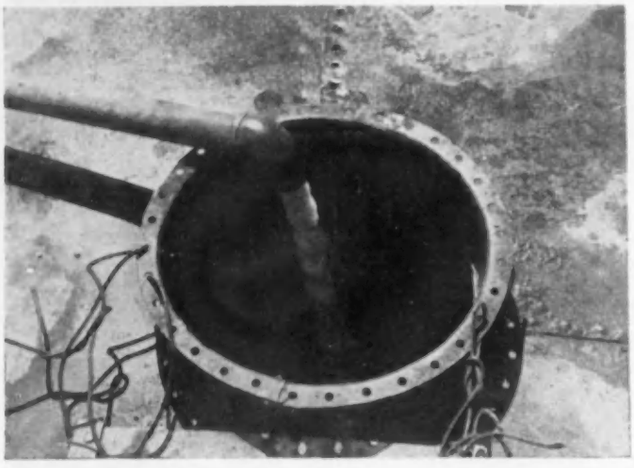




1. Virgil Greenwood of Oklahoma returned after three years in the Army and with a homemade rig assembled from old automobile and machine parts, struck oil on an Osage County lease. Still wearing the clothes that carried him through the Burma-China campaign, Greenwood watches his brand-new oil well, which is pumping an estimated 200 barrels daily.
2. Blowing through two straws, this young lady shows how the handicap of foaming oil has been eliminated in high-speed motors. Oil in the beaker at right, treated by an anti-foam agent developed by Gulf Oil Corporation, cannot be made to foam or bubble over.
3. Close by the historic lighthouse at Cape Hatteras, N. C., rises Standard Oil Company's Esso 1. Projected to 8500 feet, the test is a result of more than two years' geologic study of the Atlantic coastal region.
4. Scouts of The Carter Oil Company recently held their annual meeting in Tulsa to discuss 1945 developments and 1946 prospects. Seated, left to right: T. G. Price, Ardmore, Okla.; Bert Brush, Casper; Luther Clark, Oklahoma City; Joe Kahl, Billings, Mont.; Ellis Stallerd, Mattoon; Kenneth A. Ackley, chief scout, Tulsa; Charley Wells, Wichita, Kans.; W. N. O'Roark, Bonneau Peters, Shreveport; D. J. Polk, Baton Rouge; and Dr. John Mullone, assistant chief engineer, Tulsa. Standing, left to right, J. R. Fitzhugh, head of the statistical and economics department; Lloyd Harris, geologist, and H. F. Moses, vice president in charge of exploration, all of Tulsa.
5. First four-motored airline plane to be manufactured since Pearl Harbor is this Douglas Skymaster, 44-passenger model. Twenty-three more of these sky giants, $15 million worth, are now on order. Below is the city of San Francisco.

—Acme Photo

Mancos Shale oil flowing into a tank. The light character of the 42-gravity crude is obvious in the frothy flow character. This is a light green, paraffin base crude, resembles a mixture of SAE 10 motor oil and gasoline.

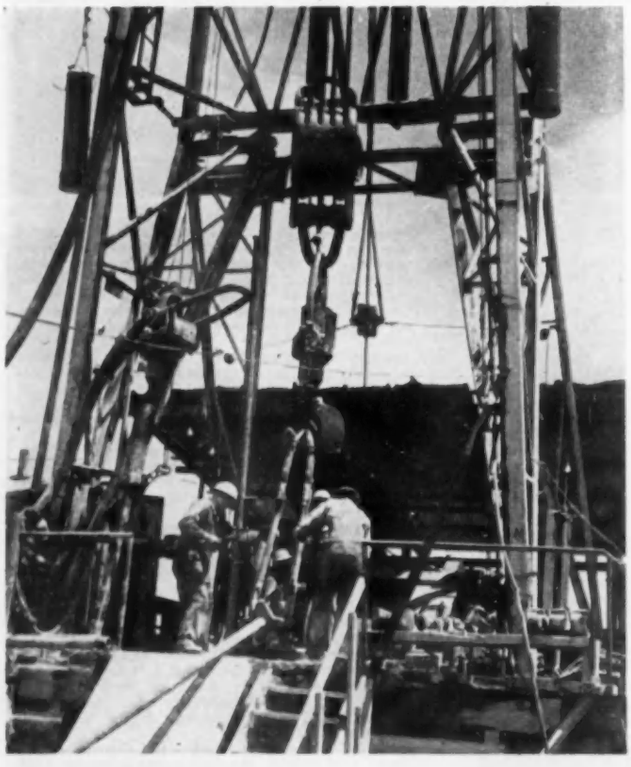


One of the caves in the north rim-rock, the Mesa Verde Sandstone cliffs which surround the Rangely field, approximately marking the limits of the oil structure.

—Photo by Bosco, Denver

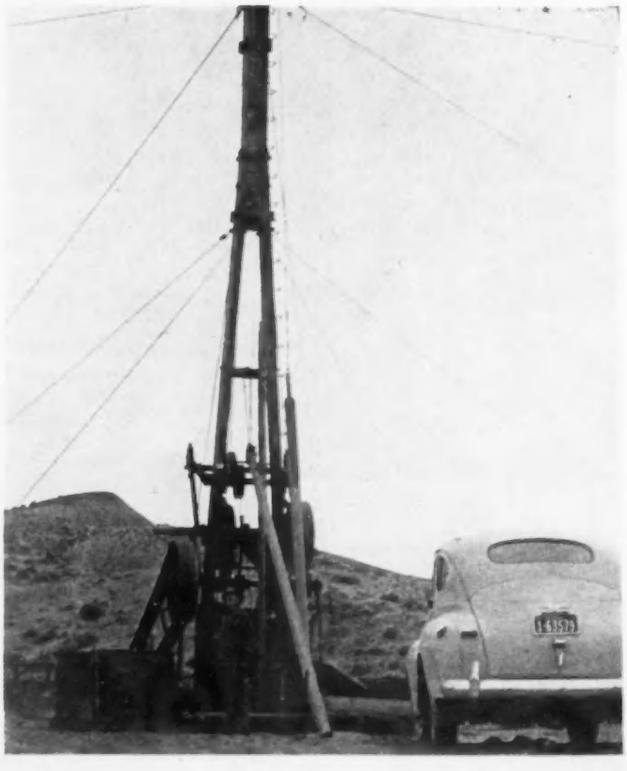
Rangely Field

Largest Addition to Reserves in 1945



Bringing a joint of pipe into the derrick to continue drilling on The Texas Company's Union Pacific 1-32.

—Photo by Bosco, Denver



A shallow-well drilling rig, located in the southeast corner of sect. 6. F. N. Bosco standing near the base.

View from section 5, Twp. 2n, R. 102w, on the southwest edge of the basin, toward the east and south rimrock.

By FRANK N. BOSCO,
Engineer-Geologist, and
J. D. BRAWNER, Geologist

THE Rangely, Colorado, oil field, is the most outstanding addition to American, if not World, oil reserves for 1945. Located on the White River about 15 miles east of the Utah boundary, the field is in an underdeveloped region. Although the locale of the field runs the gamut of boomtown descriptions, from poor or inadequate housing and bad roads to all the extremes of such living, development is progressing rapidly.

Rangely field, being of approximately the same elevation (5200 feet above sea level) as Denver, has a comparable climate. Winter conditions prevail from December into April, with consequent slower drilling rates and higher development costs.

At this time, Rangely oil is moving to Salt Lake City refineries by way of Wamsutter, Wyo. The Stanolind Pipe Line Company (Standard Oil) had a ten-inch pipe line completed in September, 1945, which is the first such outlet for Rangely. Previously, all production was moved by truck-tankers. Stanolind has recently announced new low pipe line rates for its lines from Colorado and Wyoming to Illinois, which fact places the impressive quantity of Rangely reserves in a strong competitive position with Mid-continent crude in Eastern markets. Other lines are being planned to Denver and elsewhere.

Field's History

Rangely was recognized as a source of oil by the early settlers (our first geochemists) who named the intermittent stream flowing across the axis, "Stinking Creek." The name was derived from the fouling of the stream by oil seeps, which occur in the topographical basin that coincides with the exposed surface of Rangely dome. This basin is known as Raven Park. (See Figure 1.)

The commercial oil possibilities of the field were first indicated in 1902 by the drilling of a well into a productive portion of the Mancos Shale. This well encountered oil at 800 feet and again at about 1700 feet.[2] It produced seven barrels of oil per day for a short time, and led to intermittent drilling of similar wells up to the present time. In addition to the Mancos shale wells, seven or eight wells were drilled to the base of the Dakota sandstone over a 20-year period, 1907-1927. These wells proved the Dakota to be gas-bearing, and also to have abundant water in the formation.

The first important deep well, in terms of extension of the knowledge of deeper horizons, was The California Company's Raven 1, completed in 1933 at 7173 feet. Gas was found in a thin lenticular sand of the Morrison formation, and oil was discovered in the Pennsylvanian Weber sandstone. The Pennsylvanian was topped at about 5575 feet, and the hole bottomed at 7173 feet in red sandstones of the same age, which lie below the Weber oil-producing zones. This discovery well was shut in until late 1943, when it was reopened and placed on flowing production of about 225 barrels per day. The plethora of oil from the East Texas field in the early 1930's, and the weak demand for black oil retarded development of the field.

Development of the Pennsylvanian oil commenced in 1944, and was accelerated rapidly because of wartime needs for petroleum. The postwar need for increased domestic supplies is keeping the field active. At the present time the following companies are among those drilling at Rangely: The California Company, The Texas Company, Stanolind Oil & Gas, Phillips Petroleum, Continental Oil, and Idaho-Sharples-Wasatch. In the middle of February, 1946, there were 28 deep wells drilling, and 41 wells completed and producing from the Weber sandstone.[1]

Rangely field extends across the top of an elliptical dome trending northwest-southeast, in Townships 1 and 2 north, Ranges 101-103 west, Rio Blanco County. It is an asymmetrical fold with the

F. N. BOSCO'S experience includes years of working in Colorado, on water-works construction, in mines and mills, during which time he was awarded the degree of petroleum engineer from Colorado School of Mines. Following this were more years of oil field experience and study, from the East Texas field through the Gulf Coast fields and Louisiana, Venezuela (lake-bed drilling at Maracaibo), back to the Illinois fields, and then to Brazil as manager of exploration and a study of oil possibilities. Returning to the United States in 1940, he made an areal and detailed study of the Colorado plains and mountains, receiving in 1941 the degree of master of petroleum engineering. (He incidentally mined Uranium for eventual use in the atomic research phase recently concluded at Nagasaki.)

J. D. Brawner has a background of engineering and geological experience in Canada and in the Rocky Mountain province of the United States. He holds the degree of B.Sc. in structural engineering from Colorado University, and the degree of M.Sc. in geology from Massachusetts Institute of Technology. At the latter institution he participated in research on the application of induced radioactivity to petroleum problems. His work included use of the M.I.T. cyclotron for neutron bombardment of materials used in the study. This was applied in atomic bomb research.

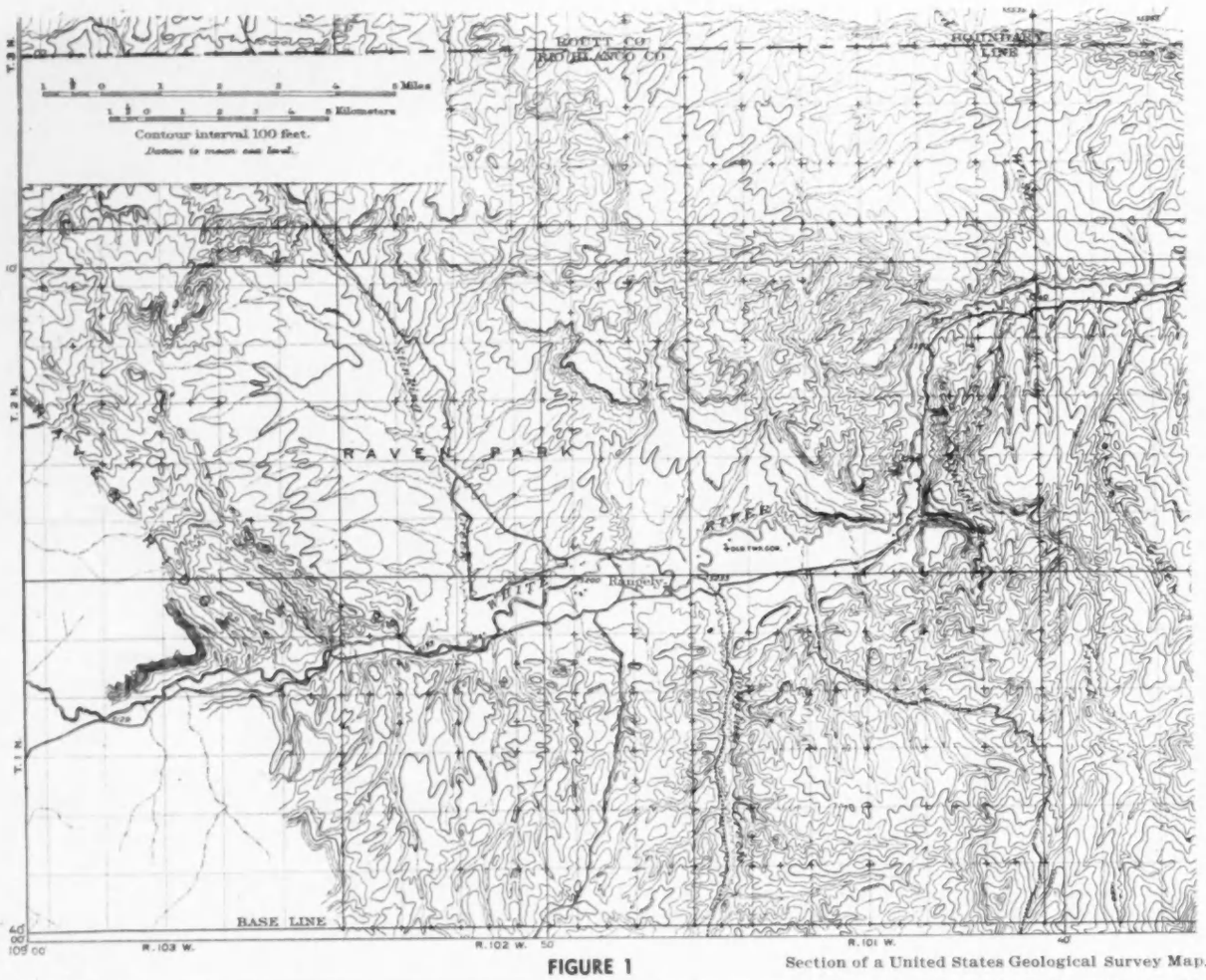


FIGURE 1

Section of a United States Geological Survey Map.

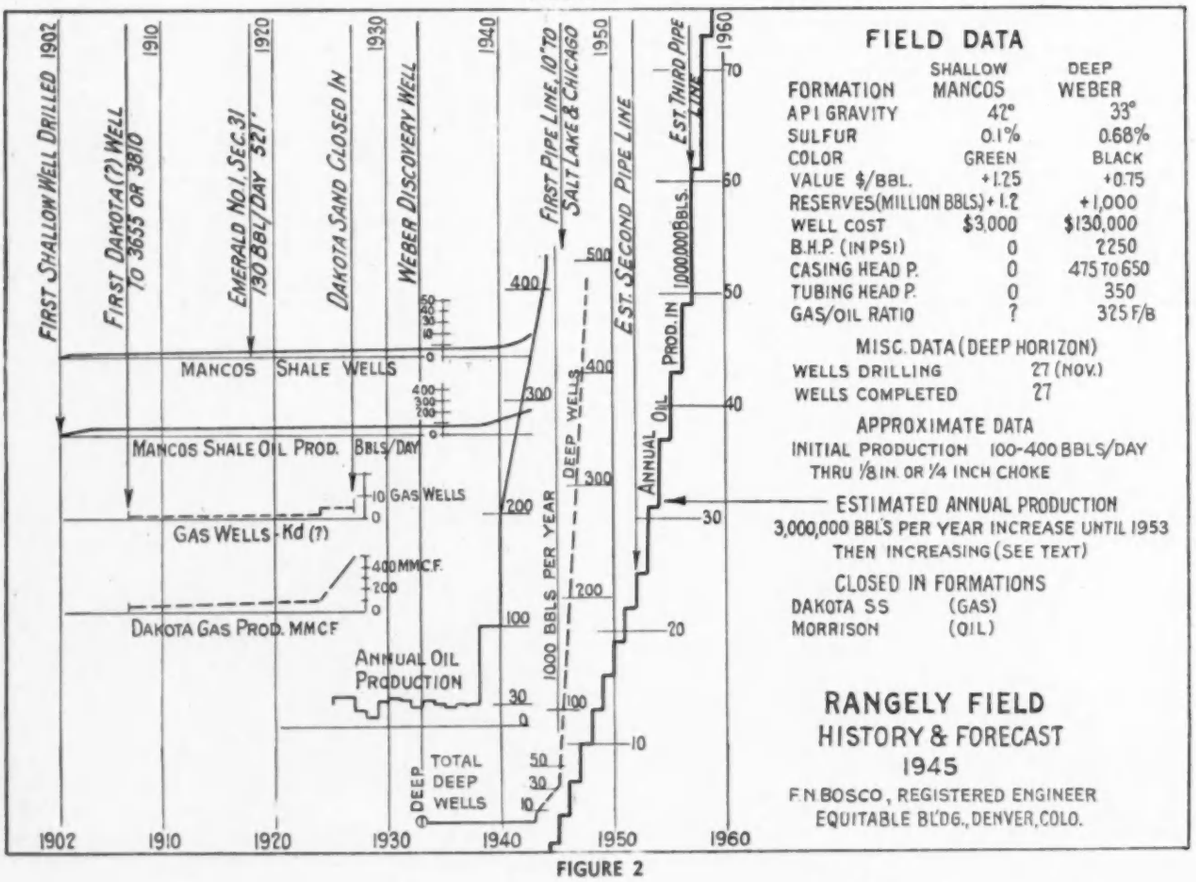
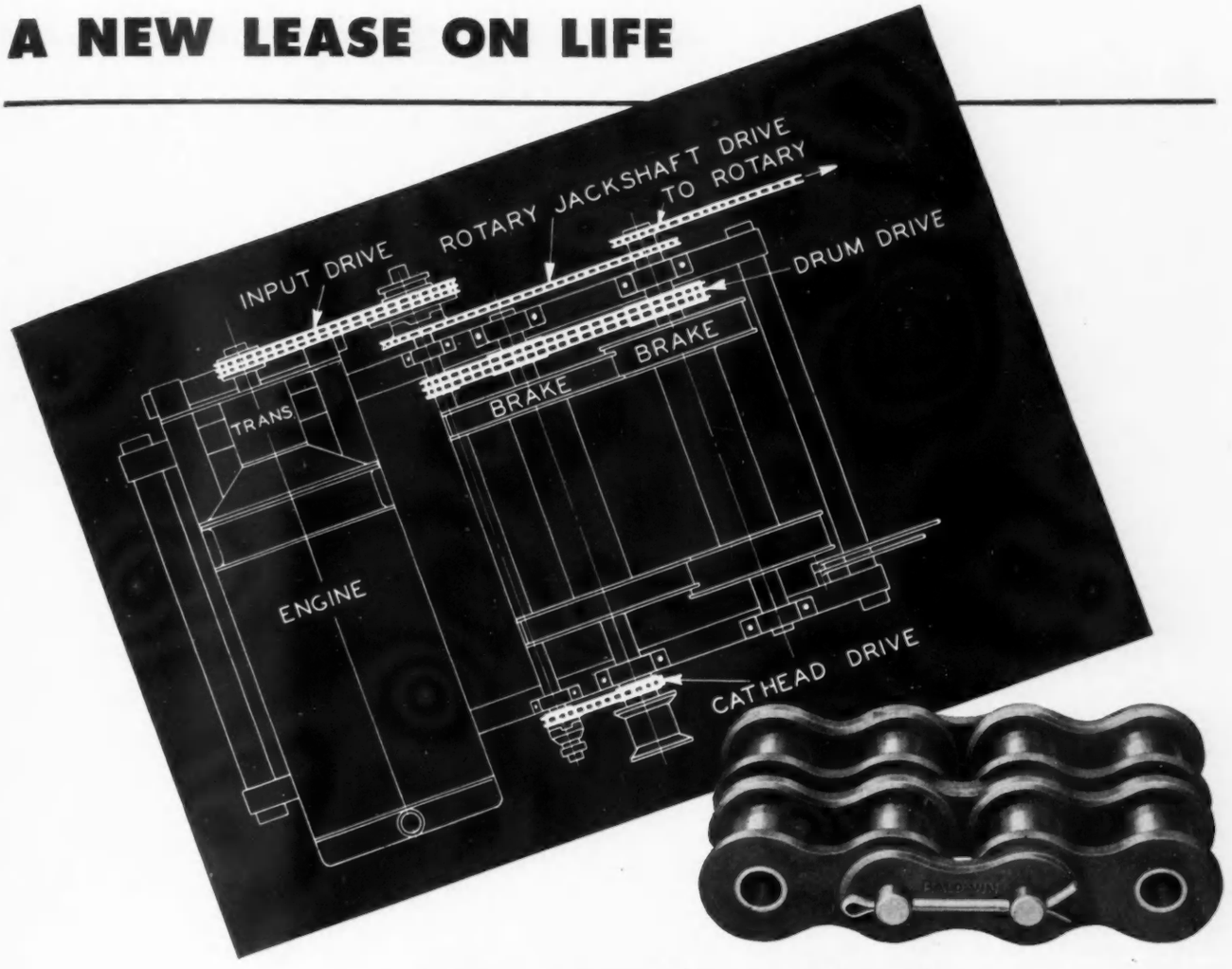

FIRST SHALLOW WELL DRILLED 1902
FIRST DAKOTA (?) WELL TO 3655 OR 3810
EMERALD NO. 1 SEC. 31 130 BBL/DAY 527°
DAKOTA SAND CLOSED IN
WEBER DISCOVERY WELL
FIRST PIPE LINE, 10" TO SALT LAKE & CHICAGO
EST. SECOND PIPE LINE
EST. THIRD PIPE LINE
MANCOS SHALE WELLS
MANCOS SHALE OIL PROD. BBLS/DAY
GAS WELLS
GAS WELLS - Kd (?)
400 MMCF
DAKOTA GAS PROD. MMCF
ANNUAL OIL PRODUCTION
1000 BBLS PER YEAR
DEEP WELLS
ANNUAL OIL PROD. IN 1000000 BBLS.
TOTAL DEEP WELLS
1902
1910
1920
1930
1940
1950
1960
FIELD DATA
FORMATION — SHALLOW MANCOS — DEEP WEBER
API GRAVITY — 42° — 33°
SULFUR — 0.1% — 0.68%
COLOR — GREEN — BLACK
VALUE $/BBL. — +1.25 — +0.75
RESERVES (MILLION BBLS.) — +1.2 — +1,000
WELL COST — $3,000 — $130,000
B.H.P. (IN PSI) — 0 — 2250
CASING HEAD P. — 0 — 475 TO 650
TUBING HEAD P. — 0 — 350
GAS/OIL RATIO — ? — 325 F/B
MISC. DATA (DEEP HORIZON)
WELLS DRILLING — 27 (NOV.)
WELLS COMPLETED — 27
APPROXIMATE DATA
INITIAL PRODUCTION 100-400 BBLS/DAY THRU 1/8 IN. OR 1/4 INCH CHOKE
ESTIMATED ANNUAL PRODUCTION
3,000,000 BBLS PER YEAR INCREASE UNTIL 1953 THEN INCREASING (SEE TEXT)
CLOSED IN FORMATIONS
DAKOTA SS (GAS)
MORRISON (OIL)
RANGELY FIELD
HISTORY & FORECAST
1945
F. N. BOSCO, REGISTERED ENGINEER
EQUITABLE BLDG., DENVER, COLO.

FIGURE 2

A NEW LEASE ON LIFE



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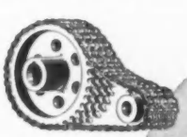

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View from the southwest edge of the field, showing the much-dissected bad land topography characteristic of the edges of the anticline where the dips are steeper. Burning waste oil forms a spectacular and characteristic plume of smoke.

steeper southwest flank apparently dipping 15 to 20 degrees, and the northeast flank dipping about 6 degrees. Normal faults running northeasterly across the axis are visible in the high cliffs of lower Mesa Verde sandstones composing the rim rock; and accompanying fractures are made evident in the shale basin by means of residual calcite which lines these fractures. The fractures yield shallow oil production in the Mancos shale at points where they are not entirely filled with calcite.

In Figure 3 is given the geologic column of formations encountered in wells drilled to the Pennsylvanian. Brief descriptions and the normal thickness of each formation are given in the figure and these will not be repeated here.

The field has at least four distinct hydrocarbon-producing horizons. From the surface downward, these are the Mancos shale (oil), the Dakota sandstone (gas), the Morrison lenticular sandstones in shale (gas, oil), and the Weber quartzitic sandstone (gas and oil). Since the Mancos shale and the Weber sandstone are the only oil-producing horizons now being developed, they will be discussed separately and in more detail below.

As yet, possible oil-producing formations below the Weber have not been tested. The Leadville limestone, of Mississippian age, and the contact of the lowest sedimentary rocks with the basement complex are two of the best possibilities for deeper production. The recent discovery of green oil at Oregon Basin, Wyoming, in the Cambrian Deadwood sandstone overlying the granite provides a distinct incentive for deeper drilling in the Rocky Mountain province. The results of The Texas Company's deep test to the Mississippian now testing at nearby Wilson Creek (see Index Map, Figure 3) will provide more direct information on the possibilities of deeper production at Rangely and at numerous other mapped and unmapped northwest Colorado structures with which the writers are familiar.

Drilling of the Mancos shale, initiated in 1902 (see Figure 2), resulted in moderate development of this formation as an oil producer in Sects. 5 and 6, Township 1 north, Range 102 west; and in Sects. 28, 29, and 31, Township 2 north, Range 102 west. Drilling was slow until 1919, when a yield of 130 barrels per day from a depth of 521 feet was encountered in Emerald 1, Sect. 31, Township 2 north, Range 102 w. This high rate of production served as a stimulus, and thereafter, many shallow wells were drilled. Some of these, however, were too shallow, and were drilled merely to satisfy government lease requirements. They were non-indicative and, therefore, should not be included as Mancos shale oil tests. Of those wells which were properly located geologically, at least 25 were still open to production in 1945.

The geological location of Mancos shale wells is considerably more than a surveying problem on a known geologic structure. It is generally stated that a well must intersect, or be bottomed in a fracture zone of the shale. It is supposed that the oil accumulation is in fissures in shale, the surface evidences of which have been correlated with the accumulations of calcite that remain in situ after the erosion of some 1650 feet of shale and sandy shale. It is possible that sandy shale members may help to sustain the flow of oil into the fractures. It is quite probable that the paraffinic oil is indigenous to the Mancos shale, not only because it is of different gravity than oil found in the deeper formations, but also because the rock is a black organic shale containing abundant remains of marine organisms and is, therefore, an excellent source bed. There seems to be no reason for seeking any outside source for this oil.

It is required, apparently, that a well also strike a porous part of such fracture zones and not some part of which is completely filled with calcite. This latter requirement cannot be as satisfactorily predicted as can be the first. Careful surface study and accurate logging of material encountered in nearby wells, all correlated by a geologist familiar with the entire problem, are the minimum essentials for a proper location.

One of the most recent discoveries is that made by Newton Oil Company in Government 12-D, Sect. 10, Township 1 north, Range 102 west. This was intended to be a deep well, but it made a good oil show in the Mancos, flowing and heading temporarily at a rate of approximately 480 barrels per day. It then subsided, still making considerable gas, so that it is now being used as a source of fuel for drilling deeper wells. Two or three other wells recently completed in the Mancos shale have had initial production of 50 to 100 barrels per day.

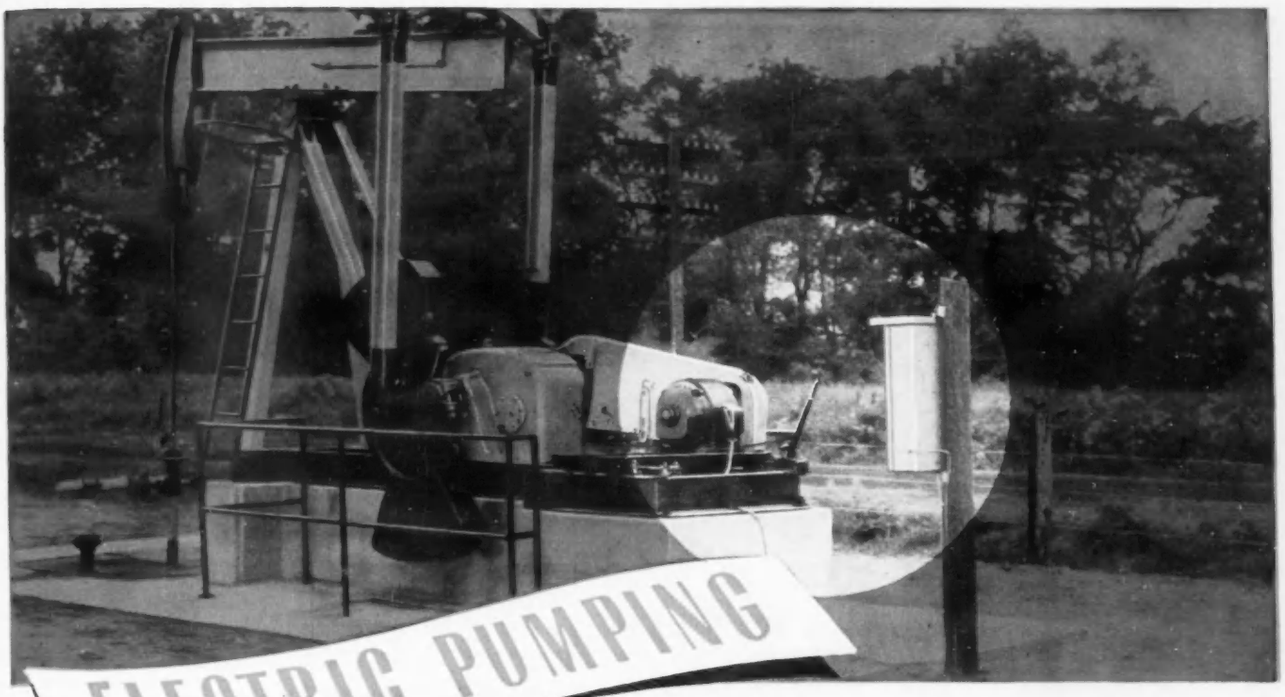
It is significant that persistence and intelligence applied in the development of these shallow wells have been rewarded. Future returns can be obtained from such development of the Mancos, because of the large area of the basin not yet investigated. Moreover, this shallow work is made profitable by the fact that the oil is of higher grade than that produced from the Weber. It has a gravity of 42, is of paraffin base, and resembles in appearance a mixture of about 20 percent SAE 10 Pennsylvania motor oil and 80 percent gasoline. The oil is a source of superior lubricant and of excellent fuel.

The drilling of Mancos shale wells is a relatively inexpensive problem. Drilling cost average about $3 per foot for the 1000 feet of depth of the average well. The only casing required is a single joint set and cemented at the surface. The hard, dry shale forms a wall extremely durable and iron-like. All of these wells, up to the present, have been pumped for production, because of the virtual absence of dissolved gas in the oil. The pumping units are of light weight, and production costs are low.

Of course, the much larger production from the Weber wells, and the recent deep-drilling boom in Rangely have greatly overshadowed Mancos testing. Nevertheless, the further development of shallow oil in this field is attractive and profitable for the smaller independent companies.

Weber (Deep) Oil

The Weber sandstone, roughly 1200 feet thick, is a very fine-grained, light gray quartzitic sandstone in its upper 300 feet. There are thin sandy dolomite beds at the top, mottled maroon to buff, and streaked with black gilsonitic sand, all very hard and tight. Several red micaceous sandstones occur in this sec-



ELECTRIC PUMPING *that supervises itself*

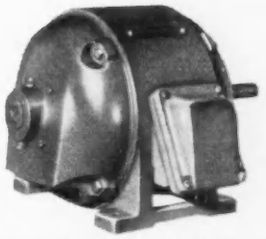
The self-timing G-E starter in this picture does its own clock-watching, automatically starting and stopping the pump at pre-set intervals. The pumping cycle is easily adjusted to fit the individual needs of the well; a simple dial setting does the trick.

The starter repeats the pre-set pumping cycle indefinitely, with no more supervision than an occasional check-up. The saving in both operating and maintenance man-hours is substantial.

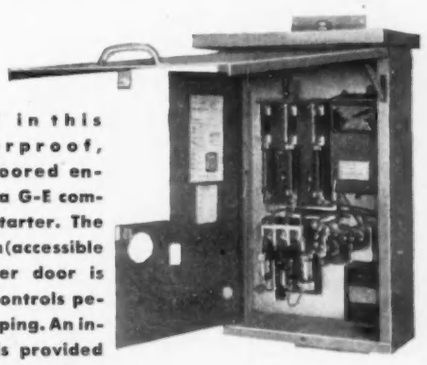
The G-E Tri-Clad* splashproof motor in this motor-starter combination is outstanding for endurance. Tri-Clad splashproof motors are protected against physical damage, electrical breakdown, and wear. They give long faithful service under outdoor conditions in mild weather. For severe weather, G-E totally enclosed motors should be used.

G-E application engineers will be glad to help you select the motors and control best suited to the conditions in your fields. Call on them through the local G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

*Trade-mark reg. U.S. Pat. Off.



The frame, end shields, and conduit box of this Tri-Clad splashproof induction motor are made of corrosion-resistant cast iron. As an extra protection against electrical failure the coils are wound with tough Formex* wire, coated with enduring Glyptal* varnish.



Housed in this weatherproof, double-doored enclosure is a G-E combination starter. The time switch (accessible when outer door is opened) controls periodic pumping. An inner door is provided to prevent unauthorized persons from tampering with "hot" parts.

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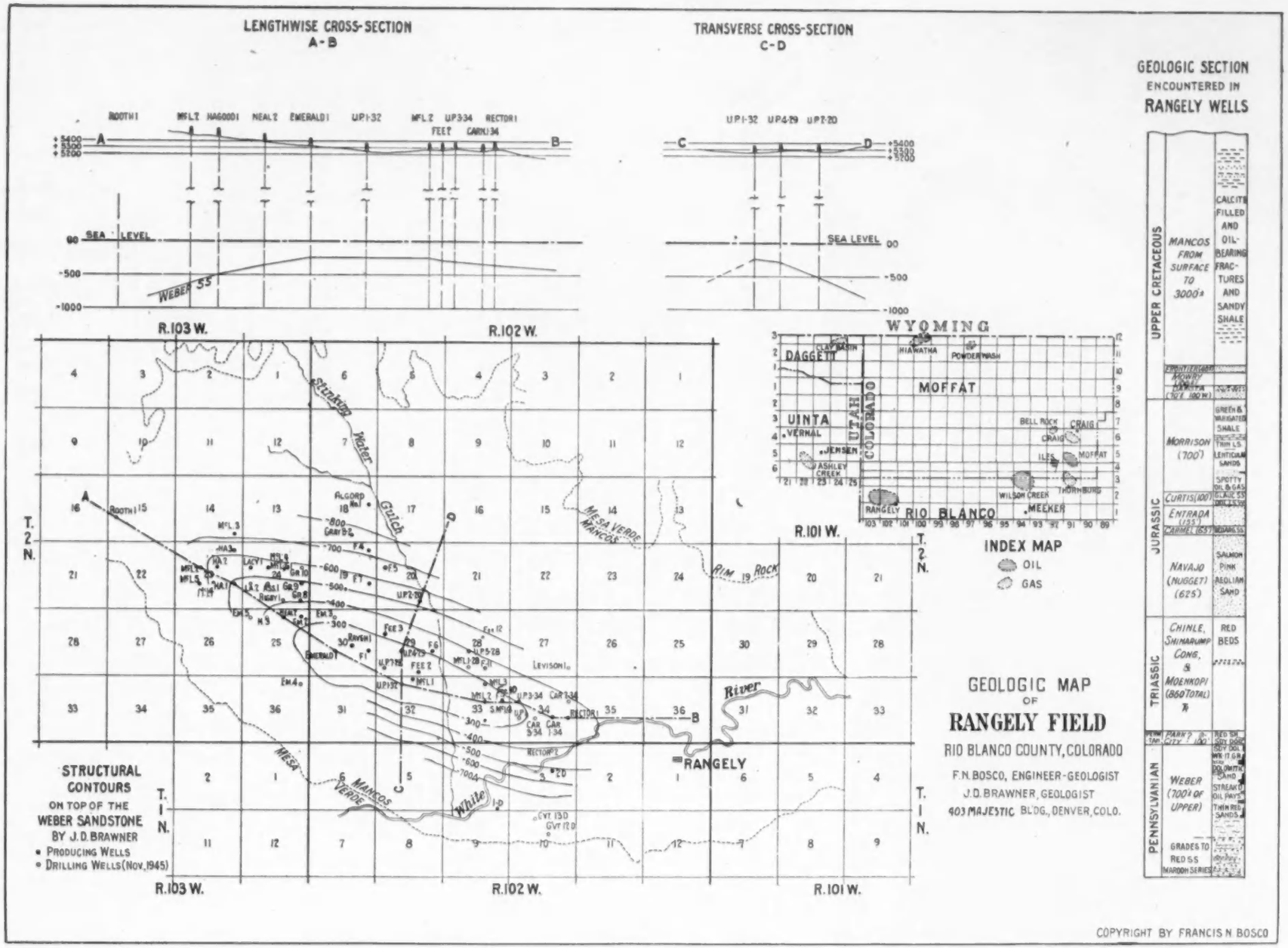
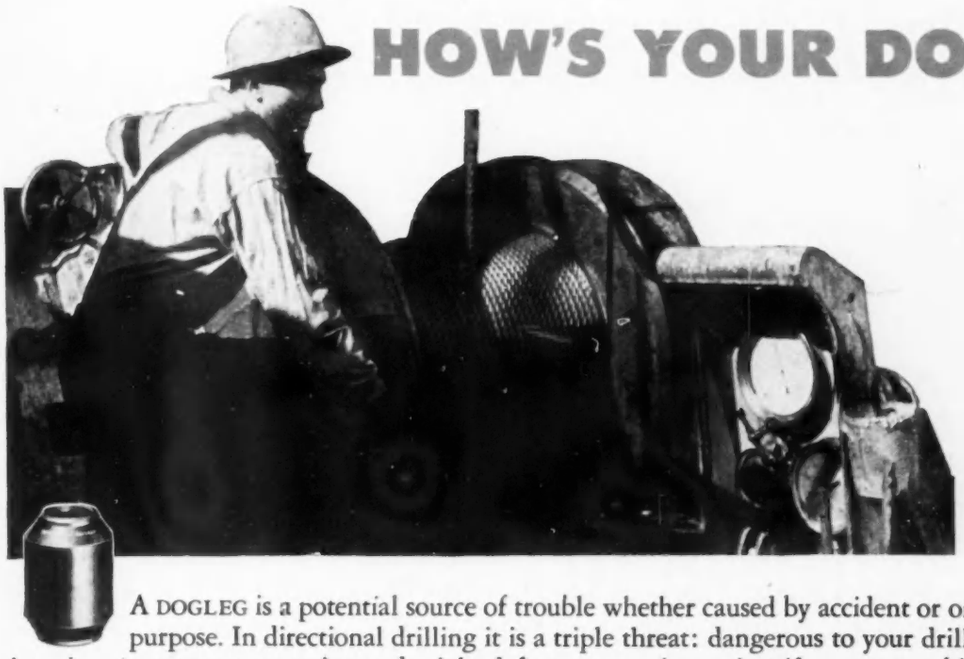
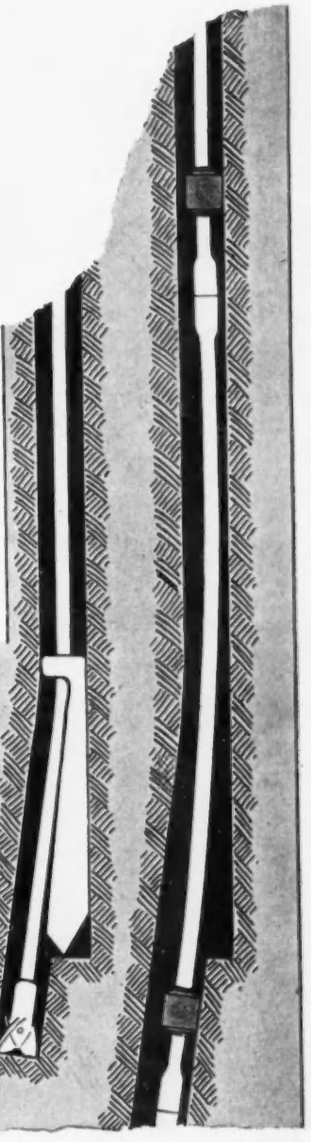

LENGTHWISE CROSS-SECTION
A-B
TRANSVERSE CROSS-SECTION
C-D
GEOLOGIC SECTION
ENCOUNTERED IN
RANGELY WELLS
SEA LEVEL
WEBER SS
R.103 W.
R.102 W.
R.101 W.
T. 2 N.
T. 1 N.
WYOMING
COLORADO
UTAH
DAGGETT
MOFFAT
UINTA
RIO BLANCO
INDEX MAP
OIL
GAS
STRUCTURAL CONTOURS
ON TOP OF THE
WEBER SANDSTONE
BY J.D. BRAWNER
• PRODUCING WELLS
◦ DRILLING WELLS (NOV. 1945)
GEOLOGIC MAP
OF
RANGELY FIELD
RIO BLANCO COUNTY, COLORADO
F.N. BOSCO, ENGINEER-GEOLOGIST
J.D. BRAWNER, GEOLOGIST
403 MAJESTIC BLDG., DENVER, COLO.
UPPER CRETACEOUS
JURASSIC
TRIASSIC
PENNSYLVANIAN
MANCOS FROM SURFACE TO 3000'±
MORRISON (700')
CURTIS (100')
ENTRADA (155')
CARMEL (65')
NAVAJO (NUGGET) (625')
CHINLE, SHINARUMP CONG. & MOENKOPI (850 TOTAL)
WEBER (700'± OF UPPER)
CALCITE FILLED AND OIL-BEARING FRACTURES AND SANDY SHALE
GREEN & VARIGATED SHALE
THIN LS. LENTICULAR SANDS
SPOTTY OIL & GAS
SALMON PINK AEOLIAN SAND
RED BEDS
STREAKS OIL PAYS
THIN RED SANDS
GRADES TO RED SS
MAROON SERIES
COPYRIGHT BY FRANCIS N BOSCO

FIGURE 3

HOW'S YOUR DOGLEG?



A DOGLEG is a potential source of trouble whether caused by accident or on purpose. In directional drilling it is a triple threat: dangerous to your drilling pipe, causes wear on casing and might defeat your entire project if you are unable to get the proper weight reading. When the whipstock is set and the pilot hole is angled off, it is only the flexibility of the drilling pipe working against the rigid casing that carries the torque around the bend. Without protectors, higher torque and greater friction result. With Patterson-Ballagh Protectors the reduction of torque and friction allows proper weight to be carried to the bit. Patterson-Ballagh Protectors, used as bearings above and below the dogleg, aid directional drilling and reduce trouble.



CASE HISTORY NO. 8 PROVES THIS POINT.

A well at Old Ocean, Texas, with a long string of 9⅝" casing set was having trouble with high torque, drilling at 11,025 feet. (350# steam against 7¾ x 7" engine). The pipe was fully protected, except for 16 protectors opposite the "dogleg." The torque reading was 85-100. These 16 Patterson-Ballagh Protectors were installed making the drill pipe 100% protected at every joint. The torque then dropped to 80-90 points. This is positive proof of the reduction of friction and the resulting tool joint and casing wear, which is the greatest cause of trouble in drilling an oil well.

Invite Us to Your Next "DOGLEG"

Your Patterson-Ballagh man is prepared to give you real help in "rubbering" your string. By use of the new VICTORY expander, shown at the left, the installation of Drill Pipe and Casing Protectors is a simple operation. Call or drop a card now, for immediate action and 100% protection. *One Protector for every Tool Joint.*

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Artesia, newest town in the U. S. Last August it was a crossroads in the sagebrush of Western Colorado. Now it has a "movie," a store, a saloon, and utilities are being installed. —Photo by Bosco, Denver

tion and vary in thickness (average, 20 feet thick) from well to well. Oil zones occur at various points within this section.

The next 300 feet of the Weber has an increasing number of red argillaceous sandstone, interbedded with white dolomitic sandstones and thin brown oil-stained sands. The remaining or lower 600 feet is non-productive and dry and consists almost entirely of red sandstone with dense limey streaks and thin micaceous red and gray shales.

Weber oil zones total at least 125 feet out of the upper 600-foot section in which they occur. The zones are spotty, not easily predictable, and have not been successfully correlated from well to well. Saturated zones, generally speckled with gilsonite, are separated either by white and gray barren quartzite or by red micaceous sandstones.

Outcrops of the Weber exposed in nearby Blue Mountain, Utah, are of a fine-grained, quartzitic rock, and to the geologist's eye the rock apparently would not be a good reservoir for petroleum. Well cuttings of the Weber at Rangely are similarly hard, and drillers wonder how a sandstone in which the hardest bit makes only 10 to 15 feet of hole can produce oil at rates of 500 to 1000 barrels a day. Porosity hinges on the degree of cementation of the sand grains by dolomite; although most of the pays are cemented to a considerable degree, some few of them are quite soft and friable.

Wells which contain the most porous Weber sands and which, thereby, are the best producers, appear to be concentrated on the north end of the dome. In November, 1945, The Texas Company brought in U.P. Unit 3-34 for 1000 barrels per day in the south end of the field (Sec. 34, Township 2 north, Range 102 west.) (See structural map, Figure 3.) Although this well is the largest producer in the field to date, it had to be shot, and is not directly comparable to wells on the north end, because they are not usually "shot." These facts indicate that every well poses continuous problems for the geologist and engineer.

Detailed microscopic examination of Weber cuttings by a competent geologist is essential for the proper completion of each well. Such work is necessary in order to obtain correct casing points, to pick shooting or perforating zones correctly, and to make intelligent interpretations of electric logs. Good sample logs of each well actually indicate the relative production to be expected. Samples inform the trained eye whether the well will be generally tight and just an average producer, or whether it contains greater amounts of soft sand zones and will be a better-than-average producer.

The gravity of the oil found in the Weber sandstone is 33° to 35° or slightly higher. It is greenish-brown and of almost 10 degrees heavier gravity than the Mancos crude. Tests show the gas-oil ratio of Weber oil to be low, ranging from 300 to 350 cubic feet to one of oil. This fact emphasizes the need of conserving gas for optimum recovery. Bottom-hole pressures are around 2200 pounds per square inch (see Figure 2).

The drilling of a Weber sand well is a complex, expensive problem, such as one would expect in excavating a hole nearly 6000 feet deep through formations of varying hardness, porosity, and fluid pressures. Jackknife rigs of 122 feet, 129 feet, and 136 feet in height are used. Standard derricks are also used. The average time on location to complete a well is about three months. Casing programs are approximately as shown in Table 1.

No casing is used through the Weber formation because of its hardness. The Weber on the south and east locations is usually shot with nitroglycerine, cleaned out, and produced through exposed formation wall. About ½ of all Weber wells drilled to date have been shot.

The cost of wells has been about $125,000, or at a rate of about $20 per foot, which figure should be materially reduced as increased knowledge of the field is obtained. The anticipated post-war reductions in labor and material costs, plus the solution of drilling problems by better engineering will also reduce the cost of drilling. At the present time, however, the political and industrial situation makes wage reduction seem improbable, and possibly undesirable, since consumer purchasing power should remain at a high level. The burden of reducing drilling costs then falls upon management and engineers, who, by the use of good engineering methods, can increase the efficiency of over-all operations and thereby reduce costs.

TABLE 1

Casing Size	Casing Depth	Formation in Which Casing is Seated
16"	To 60'	Mancos Shale
10¾"	To 1800-2100'	Mancos Shale
7"	To 5500-6000'	To Top of Weber

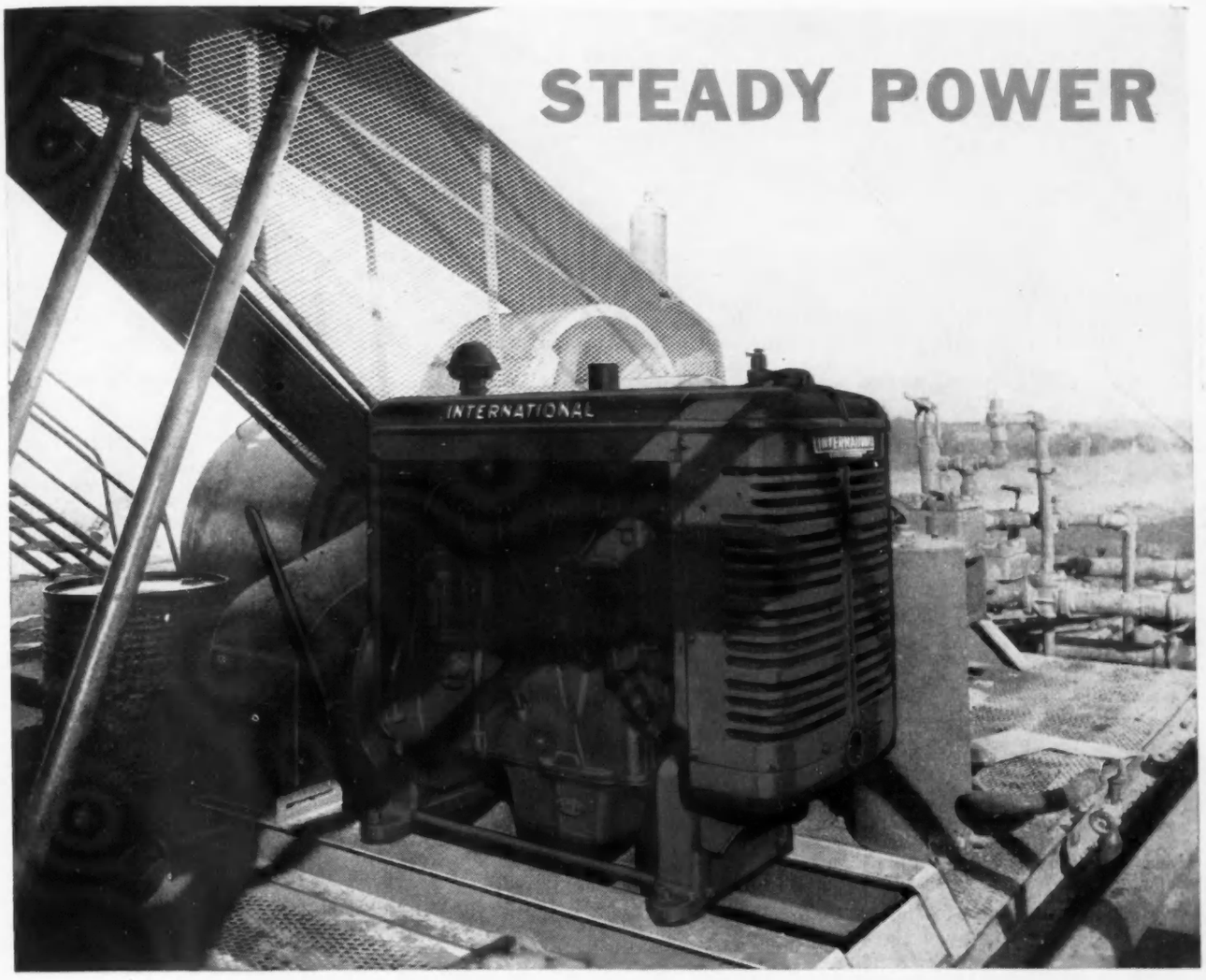
In December, 1945, The California Company had 19 producing wells, Stanolind four, The Texas Company three and Idaho - Sharpes - Wasatch three, making a total of 29 wells. A production rate of 11,300 barrels per day was reached during the first week of December, 1945, and production of Weber brown crude continues to increase.

Field's Reserves

The field limits of Rangely are not yet proven, and because the Weber has been notably water-dry, in the proven area, the limits may be far more extensive than originally supposed. The deep (5500 to 6000 feet) Weber sand production (Figure 3) occurs in approximately 600 feet of section, and conservatively averages 125 feet of saturated section over an estimated[2] area of 21 square miles (13,440 acres). Assuming a conservative 700 barrels of production per acre-foot,[3] results in a calculated estimate of 1176 million barrels (1.18 billions) of oil in the ground. The still conservative figure, which is not unreasonable, of 1000 barrels of production per acre foot[4] results in an estimate of 1.68 billions. Primary recovery methods alone will yield 30 percent or more of this oil, or (assuming the 1.18 billions above) 400 million barrels.[5] Since, with further extension of the field, the gross reserves will exceed 1 billion barrels of oil, Rangely is apparently one of the greatest additions to proven oil reserves in the United States, if not in the world, for 1945.

Reduced to per-well averages on 40-acre spacing, the estimate is approximately 3½ million barrels in the ground, or 1 million barrels of oil recoverable by primary methods. This indicates a total royalty production of 125,000 barrels per well, which will surely be obtained by the end of a 40-year production period. The present dollar-value obtained (assuming $1.00 per barrel) by use of the formula,[3a] $V_p = \frac{P}{(1+r)^n}$, is $12,100 per well, or about $300 per royalty acre. The less conservative formula,[3b] $V_p = \frac{A(R^n-1)}{R^n r}$ might be used, but the constant, A, has to be assumed, based on an assured market for black oil for 40 years of which we have no guarantee. Therefore, the latter formula is less desirable (see Table 2).

Any such forecast as Table 2 contains



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This is a 50 h.p. International carburetor-type Engine driving an auxiliary mud pump on a Magnolia Oil Company job in the West Moore Field, Texas. It's a typical installation for International Engines.

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View across Sect. 31, showing the principal location of developed shallow oil production, and some of the 36 producing wells drilled in this section.

is naturally fraught with many variables, although a conservative program such as given in the table above is not unreasonable for Rangely field. Some other unpredictable factors which may also materially affect the field are the speed of world conversion to a pacific economy, and political and industrial conditions.

Any lesser development rate than the one cited might result in premature abandonment of this field because of the replacement of petroleum as a fuel by atomic energy after another generation.[4,6] The uses of petroleum as a lubricant should not be diminished by the advent of atomic power. However, new uses of end products in the fields of synthetics, plastics, and medicine will also be found. The less desirable black oils might be abandoned or their use delayed while refining methods and new chemical uses were being found for them. Bunker fuels, and not lubes and motor fuels are their principal uses.

The future of production at Rangely is suggested by the graphic illustration in Figure 2. Additional pipe lines will have to be constructed as the production increases, as shown on the graph, the sooner these are constructed, the more rapid will be the increases in production.

The engineering problems at Rangely field are numerous and offer a real challenge to engineering talent. Among the most important problems are:

1. Preventing the mudding-off of oil or gas in the low formation-pressures of certain horizons above the Weber (Mancos shale, Dakota sandstone, and Morrison sandstones); preventing the consequent emulsification and possible destruction and loss of oil in such formations.

2. Preventing lost circulation, also in low pressure formations.

3. Proper setting of liners, which includes: (a) correct size and strength, (b) full-strength joints to resist corrosion and fluid pressure, (c) proper length for sealing off formations from which, or to which fluid migration might occur, (d) sufficient cement, properly circulated and hardened, (e) properly prepared hole.

4. Correct well completions as to the depth which will include all Weber saturated zones.

5. Correct well completions as to shooting program. The use of a too large, or a badly-placed nitroglycerine shot may readily result in loss of oil into zones not now oil saturated. (An example of the latter occurred at the historic Boulder field, Colorado, where the use of 500 quarts of nitroglycerine ruptured the formation all the way to the surface, although reportedly not affecting the casing.[5])

Some assistance to engineers at the field may be expected from the Petroleum Engineering Committee being formed under the direction of J. J. Zorichak, formerly of PAW in Denver. This type of committee has usually consisted of a fact-finding and statistics-collecting group. The real value of any such facts depends upon the prompt aggressive action which results therefrom. An active committee, eliminating most physical waste and all economic waste, and working in close cooperation with aggressive management at Rangely will be the principal factor in economical development of the enormous wealth represented by the field's reserves. All engineering and most management problems are to be supervised by registerd engineers, in accordance with the Colorado law for the registration of professional engineers.*

Unitization, the process of combining under one operating head all holdings in the field, in the interest of efficient operation, is being considered for this field. Among the benefits of such a plan are the elimination of too closely spaced wells, and the decrease of costs that are brought about by correlating and planning activities on a field-wide basis. Unified command is as necessary in peace as in war.

Table 2

Estimated Annual Increase in Production

OPERATOR	Actual Number of Rigs, as of Dec., 1945	Estimated New Wells Per Year	Resulting Increase in Annual Production
The California Co.	11	*15	1650 bbls/day
The Texas Co.	6	*9	900
Stanolind Oil and Gas Co.	4	6	600*
Phillips Petroleum Corp.	2	6	800
Newton Oil Co.	1	3	400
Continental Oil Co.	1	3	400*
Idaho-Sharples-Wasatch Corp.	3	12	1200
Miscellaneous Companies	2	18	2050
Total	30	71	8000 bbls/day, or approx. 3,000,000 bbls/yr.

This estimate of annual increase in production is based on several assumptions: (1) only moderate increases in production from major companies; (2) reduced number of rigs operated on major company holdings, because of considerable black oil supplies located elsewhere; (3) principal increases in drilling and production to come from independent companies (with smaller holdings in the field, because of their need for this oil to augment their supplies of crude. Company policies are varied in accordance with such factors as these, and the net result of all variations may be these final production figures.

* See assumptions (1) and (2).

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[1] Frazier, G. G., U. S. Geol. Survey, Denver, Colorado, personal communication.

[2] Thomas, C. R., "Rangely, One-Time Shallow Field, Now Rocky Mountains' Most Active Area," Vol. 44, No. 29, pp. 90-96, The Oil and Gas Journal, 1945.

[3a] Notation of formula used for well evaluation:
V_p = present value of a sum due n years hence
P = principal
r = interest rate of 6%
n = years

[3b] Notation of alternative formula:
V_p = present value of an annuity payable for n years
A = annual return
R = (1 + r)
r = interest rate, 6%
n = years over which annuity is paid

[4] Goodman, Clark (Massachusetts Institute of Technology, Cambridge, Mass.), "Petroleum vs. Plutonium," paper presented to the general session of the Twenty-fifth Annual Meeting of the American Petroleum Institute, Chicago, Ill., November 15, 1945.

[5] Barb, Clark F., "The Oil and Gas Industry of Colorado," Colo. School of Mines Quarterly, Vol. 37, No. 2, April, 1942, Golden, Colorado.

[6] Bosco, Francis N., "Petroleum Resources and Their Development in the Denver-Cheyenne Basin," thesis, Colorado School of Mines, 1941, Golden, Colorado.

* The Colorado state law for the registration of professional engineers states, in so far as the oil industry is concerned: "Section 1. In order to safeguard life, health, and property, any person practising engineering xxx shall be registered xxx." "Section 11. Any person who xxx not legally authorized xxx shall so practice xxx shall for each such offense xxx convicted xxx fine of not more than $500 nor less than $100, or imprisonment for not more three months, or by both fine and imprisonment." "Section 14. Engineering xxx the investigation, planning, research, design, and supervision necessary for production, operation, and maintenance of, xxx chemical works xxx hydraulic works xxx mechanical works xxx subsurface works xxx." (xxx indicates irrelevant omissions.)

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ROCK CUTTER TYPE BITS FOR HARD FORMATIONS

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January Completions Gain

Rate of exploratory drilling in United States for first month of 1946 exceeds December figures and is indication of vigorous wildcatting during year

Summary of Results of Exploratory Drilling

ITEM	Jan., 1946	Dec., 1945	Jan., 1945	% Dif. Jan. '45-'46
Oil Discoveries	33	42	45	— 26.7
New Fields	26	25	29	— 10.3
New Pays	7	17	16	— 53.3
Distillate Discoveries	5	2	1	+400.0
New Fields	2	2	1	+100.0
New Pays	3			
Gas Discoveries	14	13	5	+180.0
New Fields	13	12	4	+225.0
New Pays	1	1	1	
Total Discoveries	52	57	51	+ 2.0
Extensions to Fields	12	12	11	+ 9.1
Oil Fields	8	10	10	— 20.0
Distillate Fields		1		
Gas Fields	4	1	1	+300.0
Total Prod. Tests	64	69	62	+ 3.2
Dry Holes	338	230	359	— 5.8
(Weekly Average)	67.6	57.5	71.8	— 5.8
Wildcats	328	288	347	— 5.5
New Pays	7	1	4	+ 75.0
Outposts	3	1	8	— 62.5
Total Exploratory Tests	402	299	421	— 4.5
(Weekly Average)	80.4	74.8	84.2	— 4.5
Percent Productive: (Weekly Average)	15.9	23.1	14.7	
Percent Dry: (Weekly Average)	84.1	76.9	85.3	

Dry hole completions are from weekly reports and totals represent completions for 5 weeks in January, 1946; 4 weeks in December, 1945; 5 weeks in January, 1945.

THE RATE of exploratory drilling in United States in January indicates a year of vigorous wildcatting. Although operations were handicapped by the serious steel problem, completions were only slightly less than those of the opening month of last year, which was very active. With the end of the strikes apparently in sight and the manpower shortage easing, there is a possibility that the industry may be able to fulfill its indicated desire to drill slightly more wildcats than it did in 1945.

Although it is indicated that total completions will be slightly fewer in 1946 than in 1945, information supplied THE OIL WEEKLY for its annual forecast of drilling (Feb. 11, 1946, page 124) held out the prospect of approximately 4480 wildcat completions this year against the all-time high actual of 4337 in 1945.

During January, 1946, exploratory well completions in the United States averaged 80.4 per week. That was 4.5 percent less than the 84.2 weekly of January a year ago, but represented a considerable increase over the 74.8 weekly of December, 1945.

The stepping up of exploratory completions in January over the final month of 1945 was in line with the trend of drilling in general, which started an upswing after the close of the holiday period.

While the volume of exploratory completions increased over that of December, the ratio of successful tests to completions dropped from 23.1 percent to 15.9 percent for January. The latter figure was, however, slightly above the 14.7 percent for January a year ago.

Total new oil discoveries for the month decreased from 45 a year ago to 33, or 26.7 percent. New fields showed a decrease of 10.3 percent and new pays in existing fields dropped 53.3 percent. Extensions to established fields were 20 percent under last year.

Gas and distillate discoveries increased considerably, as did extensions to gas fields. There were no extensions to distillate fields in January or in the same month last year.

Texas led all states in successful tests, showing 17 producers. Oklahoma was next with 9, followed by Kansas and Louisiana with 7 each. Kentucky, Indiana, Illinois and Michigan recorded 5, 4, 3 and 3, respectively.

With the increased output of drilling and production materials exploratory drilling will steadily rise. With the settlement of the labor difficulties manufacture of automobiles and private aircraft will necessarily affect the oil market, calling for increased exploration.

Results of Exploratory Drilling in January, 1946, by Districts

STATE OR DISTRICT	JANUARY, 1946														
	Productive Tests									Total Productive	Unproductive Tests			Total Exploratory Tests	
	New Fields			New Pays			Extensions								
	Oil	Gas	Dis.	Oil	Gas	Dis.	Oil	Gas	Dis.		Wildcats	New Pays	Outposts	Jan., 1946	Jan., 1945
Alabama	..	..	..	..	..	..	..	..	..	..	2	..	..	2	3
Arkansas	..	..	..	..	..	..	1	..	..	1	1	..	1	3	3
California	..	1	..	..	..	..	..	..	..	1	32	..	..	33	26
Colorado	..	..	..	..	..	..	..	..	..	..	1	..	..	1	1
Florida	..	..	..	..	..	..	..	..	..	..	3	..	..	3	1
Georgia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Illinois	1	..	..	1	..	..	1	..	..	3	34	..	..	37	37
Indiana	3	..	..	1	..	..	..	..	..	4	6	..	..	10	8
Iowa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Kansas	4	..	..	..	..	..	2	1	..	7	37	..	..	44	48
Kentucky	2	1	..	2	..	..	..	..	..	5	8	..	..	13	21
Louisiana	4	..	1	..	..	2	..	..	..	7	10	..	..	17	28
North Louisiana	1	..	..	..	..	1	..	..	..	2	8	..	..	10	16
South Louisiana	3	..	1	..	..	1	..	..	..	5	2	..	..	7	12
Michigan	1	..	..	..	1	..	1	..	..	3	14	..	1	18	25
Mississippi	..	..	..	..	..	..	..	..	..	..	5	..	..	5	15
Montana	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..
New Mexico	..	..	..	..	..	..	1	..	..	1	6	1	..	8	8
Ohio	..	2	..	..	..	..	..	1	..	3	5	..	..	8	5
Oklahoma	6	2	..	..	..	..	1	..	..	9	45	..	..	54	37
Pennsylvania	..	2	..	..	..	..	..	..	..	2	..	..	..	2	..
Tennessee	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..
Texas	5	4	1	3	..	1	1	2	..	17	113	6	1	137	149
East Texas Border	..	1	..	..	..	..	..	..	..	1	1	..	..	2	1
Rest of East Texas	..	..	..	..	..	..	1	1	..	2	13	..	..	15	9
North Texas	4	..	..	2	..	..	..	..	..	6	24	2	..	32	35
West Central Texas	..	1	..	..	..	..	..	..	..	1	20	1	..	22	9
West Texas	1	1	..	1	..	..	..	..	..	3	4	2	1	10	33
Texas Panhandle	..	..	..	..	..	..	..	..	..	..	4	1	..	5	1
Upper Gulf Coast	..	..	..	..	..	..	..	..	..	..	14	..	..	14	17
Lower Gulf Coast	..	..	1	..	..	1	..	1	..	3	20	..	..	23	25
Southwest Texas	..	1	..	..	..	..	..	..	..	1	8	..	..	9	18
South Central Texas	..	..	..	..	..	..	..	..	..	..	5	..	..	5	1
West Virginia	..	1	..	..	..	..	..	..	..	1	2	..	..	3	..
Wyoming	..	..	..	..	..	..	..	..	..	..	2	..	..	2	4
Total United States	26	13	2	7	1	3	8	4	..	64	328	7	3	402	421

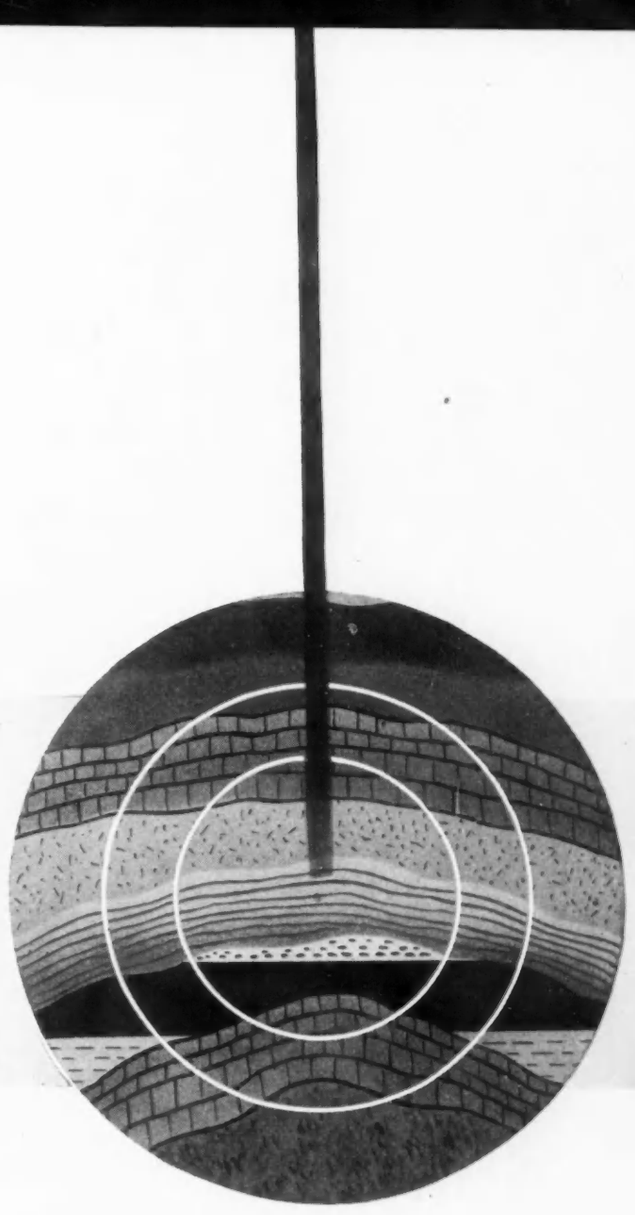
Louisiana Allowables Set

Lousisiana allowables for February, as published by the Department of Conservation, show a total of 412,515 barrels daily, including pipe line oil and condensates. The current allowable represents an increase of 11,301 barrels daily over January. Bureau of Mines estimate was 392,000 barrels. For February North Louisiana was allowed 86,162 barrels and South Louisiana 326,353 barrels.

Spacing Orders Sought

Spacing orders for the Barry and Canard gas pools of Okfuskee County which would limit the pools to one and two wells respectively, are being sought by the Amerada Petroleum Corporation, Tulsa, in a petition filed with the Oklahoma Corporation Commission.

GROUND WORK



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New Oil and Gas Fields and New Pays Horizons Discovered in the United States in January, 1946

Also Important Extensions to Established Fields

COUNTY	FIELD	COMPANY, WELL AND LOCATION	Date Spudded	Date Completed	Total Depth (Feet)	Completion Horizon (Feet)	[1]Name Character and Age of Producing Formation	[2]Initial Production Method and Choke	Gravity of Oil	[3]Structure: [4]Method of Discovery	Tentative Evaluation of Discovery or Extension (Opinion of Relative Importance of Area from General Viewpoint of the Industry Based on Pertinent but Necessarily Incomplete Data; Later Development or More Complete Data Obviously Might Require Revision of this Tentative Opinion).
		ARKANSAS—Oil Field Extension									
Lafayette	Patton	Mid-Continent's O. S. Moore 1, c se nw 33-17s-24w	10- 2-45	1-18-46	9321	9316-9319	Smackover li; Jur	F 190; 7/64"	45	Ant; Geop	Extends prod ¾ mi e ¼ mi n of disc; 2nd oiler in fld.
		CALIFORNIA—New Gas Field									
Solano		Shell Oil's McCune 1, 29-8n-1e, 6 mi e of twn of Winters		1- -46	5528	5209-5239	Sd; Eoc	F 6 mln			
		ILLINOIS—New Oil Fields									
Clay	Hoosier	N. V. Duncan-J. Leonard 1-A, sw se ne sec 2-4n-7e	12- 6-45	1-22-46	3007	2551-2574	Cypress sd; Miss	P 145; 7 wtr		Ant.	Possible prod area limited by dry holes within 1 mi to n and w, 1½ mi to s.
		ILLINOIS—New Oil Pay									
Clay	Ingraham, W.	Cities Service's W. H. Wyatt 1, se nw sw sec. 13-5n-7e	12- 8-45	1-15-46	2950	2842-2847	Rosiclare (Ste. Genevieve) sdy l'; Miss	P & F 764		Ter	Same pay zone as previously reported as McClosky.
		ILLINOIS—Oil Field Extension									
White	Stokes	Pure Oil and Carter's E. S. Munsey 1, ne ne nw sec. 8-6s-9e	12- 9-45	1-15-46	3205	2555-2567	Hardinsburg sd; Miss	P 169			May join Stokes to Brownsville, Hardinsburg prod, 1 mi to nw 15 to 30 locations betw here and Brownsville.
		INDIANA—New Oil Fields									
Gibson		Ryan Oil Co.'s Kern 1, se sw sw 23-1s-12w		1- -46	1980	1965-1980	Cypress sd; M. Miss	F 144			
Gibson		Ryan Oil Co.'s Putnam 1, ne nw nw 26-1s-12w		1- -46	1801	1796-1801	Harbinsburg sd;M Miss	P 23			
Posey		Magnolia's Armbruster 2, nw se se 14-7s-14w		1- -46	2756	1949-1958	Waltersburg sd; U Miss	P 63			
		INDIANA—New Oil Pay									
Gibson	Lysle	Deep Vein Coal Co.'s Smith 2, sw se ne 1-2s-12w		1- -46	2316	2302-2316	McClosky li; Miss	P 98			
		KANSAS—New Oil Fields									
Butler		S. & L. Drilling Co.'s Bettle 1, swc 1-27s-6e, 1 mi ne of Eckel pool		1-16-46	3160	2750-2760	Lansing li; Penn	P 20; 150 wtr		N; sub	Unimportant strike.
Cowley		W. L. Hartman et al's Smith 1, se se sw 15-33s-3e, ¾ mi e of Rainbow Bend pool.		1-12-46	4265	3259-3262	Bartlesville sd; Penn	P 75		Ant; seis	Fairly gd strike; sd well saturated; ext of struct not determined.
Pratt		Huber & Hatfield's Shanley 1, ne ne 30-27s-13w, 4 mi sw of Iuka pool		1-29-46	4056	3858-4056	Lansing li; Penn	Sw 25; 150 w		N; sub	Considered unimp; struct sml.
Rice		Lauck-Moncrief's Logan 1, se sw se 12-20s-10w, 1 mi w of S. Chase pool		1-12-46	3294	3287-3294	Arbuckle li; Cam	P 25	38	Str Trp; Drlg	Not imp; disc ½ mi e of dry hole drld sev yrs ago that had sml oil shw
		KANSAS—Oil Field Extensions									
Ellsworth	Vacek	Bridgeport Oil Co.'s Zvolanek 1-B, sw sw se 29-15s-10w, ½ mi n of Vacek pool		1-27-46	3315	3308-3315	Arbuckle li Cam	P246; 110 wtr	39	Str Trp; Drlg	Drlg in gen area may prove substnt acrge betw Vaeck and Stoltenberg pools.
Russell	Mahoney	Royer & Farris' Mahoney 1, se se se 8-14s-12w, ¾ mi nw of Mahoney pool		1-22-46	2976	2935-2976	Lansing li; Penn	P 385	38	Ant; drlg.	Vry gd strike prvng approx 300 additnl acs; li vry porous; rec est at 7500-8500 bbls acre.
		KANSAS—Gas Field Extension									
Finney	Hugoton	Wood River Oil Co.'s Steckeljohn 1, nw nw se 6-26e-32w, 6 mi ne of Hugoton gas fld.		1-25-46	2668	2607-2639	Krider sd; Perm	F 8 mln		Ant; Drlg	Extnds Hugoton gas fld 6 mi ne.
		KENTUCKY—New Oil Fields									
Henderson	Anthoston	Ryan Oil Co.'s Crofton 1, 9-0-24		1- -46	2046	2025-2046	Jackson sd; Miss	P 30			
Union	Robinsonville	Joe Enberg's Blake 1, 11-P-20		1- -46	2579	2576-2579	Cypress sd; U. Miss	P 96			
		KENTUCKY—New Oil Pays									
Henderson	E. Corydon	Fleming and Swann's Green 1, 1-0-22		1- -46	2625	2620-2625	McClosky li; Miss	P 120			
Union	Uniontown	Harry Ame's Girten 1, 16-P-20		1- -46	2544	2528-2544	Aux Vases sd; Miss	P 10			
		KENTUCKY—New Gas Field									
Henderson		Kentucky Nat. Gas Corp.'s Arnett 1, 19-0-22		1- -46	1050	1030-1050	Penn sd	F 1.5 mln			
		NORTH LOUISIANA—New Oil Field									
Franklin		Gus K. Primos-C. W. Sharp's Butler 1, c sw nw 29-16n-8e	11- 8-45	1- 9-46	3787	3500-3540	Paluxy sd; L. Cre	P 65	37.9	Flt; geop	3 mi s of Big Creek, Richland Parrish
		NORTH LOUISIANA—New Distillate Pay									
Caddo	Longwood	J. R. Querbes' E. T. Currie 1, c sw sw 20-19n-16w	11- 5-45	1-23-46	6200	5525-5550	Pettit li; L. Cre	F Unest; 24.5 mln	dist.	Ant; geol & sub	Normal pay in shallow pool is Travis Peak.
		SOUTH LOUISIANA—New Oil Fields									
Beauregard	N. Oretta	Magnolia's M. J. Witzki 1, 660 nw c 22-6s-11w, 2 mi n Oretta fld	11-12-45	1-24-46	8969	8422-8440	Cockfield sd; Eoc	F 90; 7/64"	45.1	Flt; refl. seis	
Beauregard	Singer	Magnolia's Lutcher- Moore Lbr. Co. 2-C, 1980 n 660 w sec 22-5s-11w, 4 mi w Pinegrove fld.	10-15-45	1-25-46	11625	7620-7683	Cockfield sd; Eoc	F 130; 7/64"	46.1	Flt D; refl. seis	
Evangeline	Mamou	Magnolia's J. B. Morein 1, c nw sw 5-5s-1e, 6 mi s 3 mi e Pine Prairie fld.	9- 2-45	12-29-45	11653	11510-11553	Wilcox sd; Eoc	F 208; 1/8"	46.3	Sd; seis	
		SOUTH LOUISIANA—New Distillate Field									
Jefferson	Barataria Bay, E.	Texas Co.'s State-Barataria Bay 1, 8780 n 6200 e swc T-20s-25e	2-15-45	12-27-45	14490	11393-11410	Miocene sd; Mio	F 95; 1.08 mln 5/32"	55.8	D; seis	
		SOUTH LOUISIANA—New Distillate Pay									
Lafayette	N. Cankton	Shell's Breaux-Kilchrist 1, 65-8s-4e		1- 4-46	11101	10916-10966	Chickasahway sd; Olig	F 55; 7/64"	54.4	D; seis	Deepest pay in fld.
		MICHIGAN—New Oil Field									
Montcalm		Sohio Pet. Co., Union Drilling Co., and Leslie Barber's Douglas 1, nw sw se 2-12n-8w, 3 mi sw Six Lakes gas fld.	10-19-45	1-22-46	3554	3545-3554	Monroe dolo; Devon	F & Sw 57	46	Ant; geol	Oil prod incrsd by 2 acid shots but after sec shot well shwd wtr cut.
		MICHIGAN—Oil Field Extension									
Allegan	Montery	Tamblyn Development Co.'s Brown 1, ne se se 4-3n-13w, 1 mi n e fld.	10-19-45	1- 5-46	1674	1670-1674	Traverse li; Devo	F & Sw 45			
		MICHIGAN—New Gas Pay									
Osceola	Cedar	Ashby Drlg. Co.'s Boettcher 1, c nw se 28-18n-9w		1- -46	1560	1554-1560	Stray sd	F 0.71 mln			
		New Mexico—Oil Field Extension									
Eddy	High Lonesome	Forest E. Levers et al's Levers-Federal 1-B, c se ne 34-16s-29e, 1 mi e by s of pumper on same prod contour.	8-27-45	1- 1-46	3028	2632-2670	Grayburg sdy li; Perm	F 35; ½"	39	Ant. geol	Perfrtd opposite gas at 2360-63 ft to attain oil flw.
		OHIO—New Gas Fields									
Ashland		Frank Lyons' Harold Hastings 1, sec 35 Jackson Twp.		1- -46	2981	2970-2980	Clinton sd; Sil	F 3.24 mln			
Medina		William Dempsey's Ervin Wilkinson 1, lot 2 Hinckley Twp.		1- -46	3256	3200-3230	Clinton sd; Sil	F 0.20 mln			
		OHIO—Gas Field Extension									
Stark	Richfield	Belden's V. H. Weaver 1, sec 30 Canton Twp.		1- -46	4650	4613-4642	Clinton sd; Sil	F 2.19 mln			Extends pool 1 mi ne.

		OKLAHOMA—New Oil Fields										
Hughes		W. Bartlett et al's Howell 1, se sw sw 10-6n-8e, abt 1½ mi n of Sasakwa se pool	.....	1-20-46	2632	2616-2632	Booch sd; Penn	P 45	39	Ant; sub	Not considered imp; may cover abt 160 acs.
Lincoln		Atlantic Refg. Co.'s Young 1, nw sw nw 32-12n-3e, abt 3 mi s of Meeker pool	.....	1- 2-46	5765	4855-4882	Bartlesville sd; Penn	P 20	....	Ant; seis & sub	Unimportant; Wilcox sd dry.
McClain	Iron Chapel	Carter Oil Co.'s Mottinger 1, cnw nw 5-6n-3w, 4½ mi ne of Criner	.....	1-14-46	11237	10812-10922	Bromide sd; Ord	F 893; ¾"	41	Ant; seis	Imp strike on e edge of Anadarko Basin; indicates dp prod trnd on nw-se axis extending frm Blanchard to Criner.
Pottawatomie		J. F. Smith et al's Kerker 1, sw se nw 3-7n-3e, abt 5 mi e Tribbey	.....	1-17-46	4915	4536-4563	Hunton li; Dev	P 40	38	Str Trp; drlg	Undetmnd pending further drlg.
Stephens		Skelly Oil Co. et al's Chilton-Mayo Unit 1, cnw se 14-2s-4w, 3½ mi se of Alma	.....	1-21-46	7177	2915-2940	Penn sd; Penn	P 92	36	Ant; seis & sub	Fair; Hunton zones tested salt water
Stephens		Skelly Oil Co.'s Williams 1, se sw se 16-1s-4w, abt 4 mi e of Velma area	.....	1-15-46	7158	5429-5470	Dornick Hills sd; Penn	P 100	23	Ant; seis	Sml struct; gd saturation, porosity may result in rec of 8000 bbls per acre.
		OKLAHOMA—Oil Field Extension										
Cimarron	Keyes	Pure Oil Co.'s Johnson 1, sw sw se 12-5n-7ecm, 1 mi s of Keyes pool	.....	1-22-46	5010	4855-4880	Cherokee sd; Penn	P 583	41	Ant; seis	Imp ext prving approx 640 acs; 3 additnl tests in gen area may dev imp new oil res in Panhandle area.
		OKLAHOMA—New Gas Fields										
Hughes		Leach & Warren's Brooks 1, ne ne sw 7-9n-10e, 4 mi nw of Wetumka	.....	1-13-46	2688	2658-2688	Booch sd; Penn	F 5.25 mln	....	Ant; seis & sub	Isolated gas wells in radius of 3 mi from the Brooks well indicate dev of fairly lge gas area of approx 3000 acs.
Pontotoc		J. E. Crosbie, Inc's Kelly 1, ne ne sw 9-4n-7e, abt 9 mi ne of Ada	.....	1- 4-46	4456	1811-1827	Booch sd; Penn	F 3 mln	....	Ant; seis	Sml disc; possible Booch sd "pimple" covering ¼ sect.
		PENNSYLVANIA—New Gas Field										
Armstrong		Boyd & Shupp's James Dunbar 1, Kittanning Twp	.....	1- -46	1516	1487-1510	Thirty-Foot sd; Devo	.....	....	.....	.....
Washington		Lewis, Pettit et al's Everett Baumberger 1, Amwell Twp	.....	1- -46	1799	1780-1785	Injun sd; Miss	F 0.34 mln	....	.....	.....
		EAST TEXAS BORDER COUNTIES—New Gas Field										
Marion		Rogers Lacy's Scott 1, 1400 n 2700 e of nec L. A. McLaughlin sur, in Alex Johnson sur.	9-16-45	1-19-46	7530	5922-5938	Hill sd; L. Cre	F 1.6 mln	....	Ant; seis	.....
		EAST TEXAS—Oil Field Extension										
Smith	Sand Flat	B. F. Phillips et al (was C. L. Wickliffe et al's) O. Hackett-Pure 1, 800 ft nsl and e of e & w lines of 51 ac tract, 3150 ft nsl and 3050 ft ewl of Samuel Leeper sur, 2 mi n outpost.	2-20-45	12-13-45	9852	7277-7284	Paluxy li; L. Cre	P 135; 29% wtr	23.6	Flt Ant; geol	Temp. abnd as junked at 9852 ft, 7-29-43 prior to opening of fld.
		EAST TEXAS—Gas Field Extension										
Freestone	Fairfield	Barney Carter et al (was R. L. Wheelock's) 1980 ft nsl and 4400 ft ewl of Hugh S. Shepherd sur. Org owner abnd 8-43; 1½ mi n by e of Fairfield 2-pay gas fld.	8-15-43	1- 3-46	4240	4174-4184	Woodbine sd; U. Cre	F 27 mln;	....	Ant; geol	Pluged as failure prior to opening of fld. Elect from sur re-chk by new owner chrtd 10 ft of effective pay.
		LOWER TEXAS COAST—Gas Field Extension										
Goliad	Sarco Creek	Ginther, Warren & Ginther's Carrie G. Wood et al 4, 660 fr nel, se & swl blk 12, Pedro Villa sur, on 3749.9-ac lse.	10-29-45	12- 1-45	5278	5038-5047 4655-4680	Vicksburg sd; Olig Frio sd; Mio	F 5.6 mln; 3/16" F 6.5 mln; 7/8"	....	Flt; refl seis	4400 ft ne of disc well.
		LOWER TEXAS COAST—New Distillate Field										
Nueces	Minnie Bock, N.	Atlantic's Jas. H. Ewing 1, 660 fr nl 219-ac lse, 2½ sect 46 M. Lopez de Herrera gr, 219-ac lse.	9-17-45	1-20-46	8284	8244-8270	Frio sd; Olig	F 48; 32.6 mln 1/4"	50	Flt; refl seis	Sand in this well was logged by means of the Gamma Ray.
		LOWER TEXAS COAST—Distillate New Pay										
Goliad	Sarco Creek	Ginther, Warren & Ginther's Carrie G. Wood et al 3, 1487-ac lse, Geo. Villa sur. 9 mi se Goliad.	9- 9-45	12- 9-45	5105	4148-4158 5032-5045	Frio; Mio Vicksburg, Olig	F 5.5 mln; 7/16" F est 70; 1.56 mln; 7/8"	cond	Flt; refl seis	This is a new sd for the fld, dually completed.
		SOUTHWEST TEXAS—New Gas Field										
McMullen		J. W. Gorman's Reiz Bros. 1, 990 fr wl 330 fr nl AB&M sur, sect 75, 1½ mi s S. Campana fld.	12-13-45	1- 7-46	3176	1953-1958	Jackson sd; Eoc	F no gauge	....	Flt; geol	Unimportant.
		NORTH TEXAS—New Oil Fields										
Archer		Fred M. Manning, Inc.'s Wallace Ford 1-A, 1420 ft snl and 1100 ft ewl, H&TC Ry., 19, Blk 1, ¾ mi w by n of 3 well Ellenburger pool.	12-16-45	1-29-46	4163	4130-4163	Strawn sd; Penn	P & F 144	42.4	Ant; geol	Sml prod area, involving lenticular sds that will be erratic in performance.
Archer		Bridwell Oil Co.'s Oil Investment Co. 1-F, 3127 ft ewl and 2157 ft n by sl blk 125, John Richards-J. W. Harris subdiv., near old shallow pool.	10-15-45	12-26-45	4925	4860-4866	Bend li; Penn	P 8; 2 wtr	40.6	Ant; geol	Orig schedld for plugng. Not inp.
Montague		S. D. Johnson et al's Lee Crenshaw 1, 2002 ft nsl and 2196 ft wel of W. Wallace sur, A-834, 1⅝ mi nw of Belcherville 5300-ft Bend cgl fld.	10-24-45	1- 1-46	5721	5550-5565	Bend cgl; Penn	P 75; 4 wtr	47	Ant; geol	Abt 200 ft lwr structurally than nearby belchervill fld; sml prod area.
Young		L. T. Burns et al's J. P. Dunagan 1, 330 ft out of nec sec. 170, TE&L Co. sur, ⅛ mi n of Crain pool disc.	12-15-45	1-27-46	5240	5048-5064	Miss li; Miss	F 2,000; ½"	41	Ant; geol	Sml local high; correlates 94 ft low to nearest Crain fld prod. Ratio of failures to prod will be high.
		NORTH TEXAS—New Oil Pays										
Wilbarger	National	National Associated Pet. Co.'s Sam Kelly 4-A, nw ne nw H&TC Ry., 30, blk 13.	10-12-45	1-24-46	4925	4454-4478	Bend li; Penn	P 160; 8 wtr	40	Ant; geol	This 4th oil zone for fld prevsly indicated in drlg Ellenburger wells; other pays more prolif.
Young	Logan	Hanlon & Buchanan, Inc. & Ben Rankin's M. Logan 1, 330 ft s and 450 ft e of swc of E. L. Douglas sur A-2157, but in sect 3, J. Poitevent sur. A-228; ½ mi ne of 4500-ft Marble Falls disc pumper.	8-30-45	1-23-46	4014	4002-4009	Bend li; Penn	F 81; 7/32"	41	Ant; geol	Comparatively thin pay for this horizon, which will be erratic in performance.
		WEST CENTRAL TEXAS—New Gas Field										
Stephens		Fred M. Manning, Inc.'s C. J. O'Conner 1, c ne ne T&P Ry. 52, blk 7, 1½ mi ne of prod.	11-28-45	1-10-46	3348	3335-3340	Bend li; Penn	F 8.84 mln; 2"	....	Ant; geol	Posbly forerne of oil strk in immed arrea. Not imp as gas fld.
		WEST TEXAS—New Oil Field										
Dawson		Seaboard Oil Co.'s S. E. Lee 1, c se se T&P Ry. 47, blk 34, T-5-N, 23 mi s of Welch fld, nearest prod.	12- 2-45	1-24-46	3795	3730-3795	San Andres li; Perm	P 167; 9 wtr	32.3	Ant; geol	Forerunner of a subst prod ar; no apprec vol of gas and not commercl until acidized. A 7679 ft failure 1 mi n tested oil and wtr in Clear Fork, which is expected to prod near apex of struct.
		WEST TEXAS—New Oil Pay										
Andrews	Fullerton-Devonian	Mid-Continent Pet Corp.'s University 3, lse 11, 660 ft snl and 1984 ft wel sec. 29 blk 13, offsetting 8500 ft Devo wells.	5- 7-45	1- 2-46	10696	10596-10630	Ellenburger dolo; Ord	F 1974; ¾"	40.1	Ant; geol	Oil-water contact at 10,680 ft, affording 84 ft of prod Ellenburger; water-drive and gas-oil ratio subnml. Top of Ellenburger correlates 782 ft low to recent Ellenburger disc, near apex of Fullerton struct and 4¾ mi n by w.
		WEST TEXAS—New Gas Field										
Crane		Humble Oil & Refining Co.'s N. M. Tucker 1, 660 ft fr se and 4620 ft fr ne li of H&TC Ry. 22, blk 1, 1½ mi n by w of McKee pool; 1½ mi n by e of Abell fld.	10- 1-45	1-15-46	6344	5700-5720	Waddell sd; Ord	F 6.3 mln; 3/16"	.....	Ant; geol	Not imp as gas reserve due to abs of outlet.
		WEST VIRGINIA—New Gas Field										
Jackson		Sycamore Gas Co.'s Susie Staats 1, Ripley District	.....	1- -46	4838	4774-4811	Oriskany sd; Devo	F 1.055 mln	.....	.....	.....

[1] Character of producing formations abbreviated thus: ch, chalk; dolo, dolomite; li, limestone; sd, sandstone; sh, shale, ser, serpentine; cgl, conglomerate. Ages of formations abbreviated thus: Pleis, Pleiocene; Plio, Pliocene; Mio, Miocene; Olig, Oligocene; Eoc, Eocene; U. Cre, Upper Cretaceous; L. Cre, Lower Cretaceous; Jur, Jurassic; Tri, Triassic; Perm, Permian; Penn, Pennsylvanian; U. Miss, Upper Mississippian; L. Miss, Lower Mississippian; Devo, Devonian; Sil, Silurian; Ord, Ordovician; Cam, Cambrian.
[2] Barrels of oil per day (24 hr. rate), flowing (F), pumping (P), swabbing (Sw), or bailing (B); or million cubic feet of gas daily open flow capacity; size of choke given in inches. [3] Type structure abbreviated as follows: Ant, Anticline; D, Dome; Fld, Fold or Folded; Flt, Fault or Faulted; M, Monocline; N, Nose; SD Salt Dome; Str trp, Stratigraphic trap; Syn, Syncline; Ter, Terrace. [4] Method of discovery abbreviated as follows: cd, core drilling; dr, drilling; geol, geology; geop, geophysics; grv, gravity meter; ran dr, random drilling; seis seismograph; sub, subsurface geology; sur, surface geology.

Compressed Air Line Mounted on Wheels For Rapid Moving

When reconditioning pipe lines, one major company uses a two-inch distribution system from air compressor to points of use.

A MAJOR company in California which has many miles of lines strung over the country has recently commenced a reconditioning program, a work that calls for the stripping out of all lines which were layed in hot spots and cleaning with sandblast, after which the line is coated and wrapped and replaced in the trench.

Since the work is scattered over a wide area and each job consists of several hundred yards of pipe, portability is the prime consideration. The air compressor is usually spotted in a convenient location and two-inch lines laid along the trench of the main line to operate the sandblast. As these lines stretched out, it was found to be difficult to drag them farther from the compressor when a new joint of pipe was to be added. The two-wheeled carts shown in the accompanying photographs solved the problem. By mounting every third joint on one of the carts, the friction of the line was sufficiently removed to permit several joints to be moved at once. Where the hot spots to be worked are near each other, and the terrain is not rough, the entire compressor, cleaning equipment and pipe line assembly can be moved in three units. A connection with a stopcock on each side of the carts provides a ready means of connecting the air hose to the sandblaster. The carts have steel wagon wheels keyed to the axle, which rotates in the tubing attached to the short section of pipe. These were prefabricated in the shop and all parts are interchangeable. Connections are provided for pressure lubrication. The take offs for air connections are welded adjacent to the axle so that the valves are on the unit when it is moved.

This method of mounting pipe lines on carts may have wider application in fuel or water lines to drilling rigs. Where a lease is being drilled up, a line may be laid incorporating these carts, and the entire line moved to the next location when a well is completed. Also, these carts could be adapted for use under a permanent line where it must be moved to make room for salt water pits, new roads and the like. By getting rigged up for this type of operation and getting the work laid out, it often is possible to keep from taking up and relaying lines.

In this pipe line cleaning system, air distribution lines are made with short sections carrying carts so the entire strung section of the two-inch pipe line can be moved along the right-of-way without disconnecting.

The carts have steel wheels keyed to the axle which rotates in the tubing attached to the short section of pipe. Air take-offs are attached to the short section of pipe on either side of the dolly axle.

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Ends are uniform size, smooth and round.

When you really want the inside story on pipe, talk to the pipe line contractors. These are the men who *live* with pipe, day after day. They drag it over prairies, snake it through swamps, push it up mountains. They bend it, weld it, cut it—and they'll give you a straight answer as to what they think about it.

Contractors working on National Seamless lines will tell you how remarkably fast they go. Some have laid as much as 15,000 feet of 24-inch seamless in one day. Round uniform ends, easy bending, fast welding, and longer lengths account for this speed. Smooth surface, too, makes coating easier and more uniform.

To the engineer, National Seamless means more than this. It means on time deliveries when and where needed. It means smooth interior surfaces, less danger of leaks because it has no longitudinal weld, and high strength to resist both internal pressures and external strains due to earth movements and washouts.

With those who know pipe or who work with pipe, National Seamless is—America's preferred line pipe.

Smooth surface makes coating easier and more uniform.

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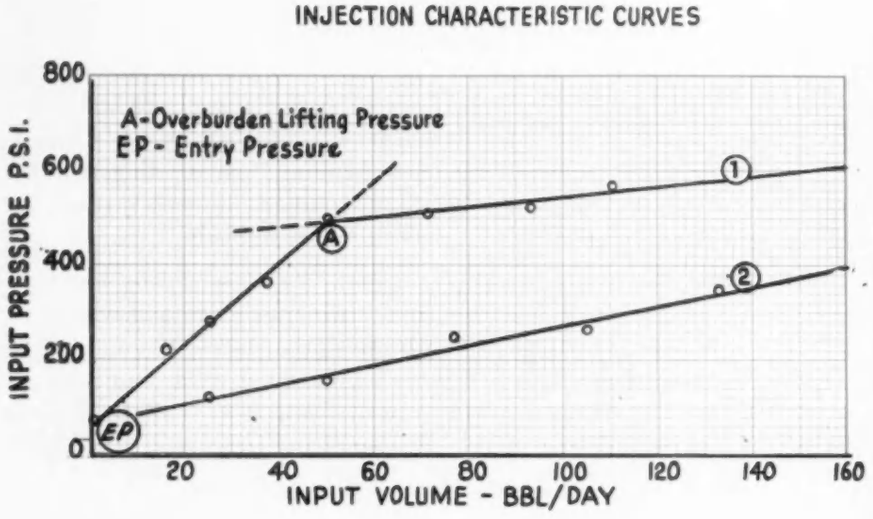
Proper Flood Injection Pressures



SELECTION of the correct injection pressure for input wells in oil field water flooding projects still presents an unsolved problem to flood operators and petroleum engineers. The problem is controlled to a certain extent by recovery vs. cost economics that is present in all flood operations. However, research and experimental work being done on the question at present deals primarily with recovery efficiency from the sand, with economic control forming definite minimum and maximum limits on injection pressures and their corresponding effect on injection water rates.

The problem is developing, in the opinion of many engineers, into a theory that by research, experimentation and correlation of results it may be possible to ascertain correct input pressures and volume rates for any floodable sand by core analysis and reservoir study prior to starting of operations. If engineers are able to accurately predict acceptable limits on injection pressures to be used for any property, technical data are now available which make injection volumes, oil recovery rates, oil-water production ratio and a yearly economic balance fairly predictable in advance. The correct rate to flood a lease, or pool, is then determinable, keeping in mind, of course, that short-lived, high input rate floods may not always be the most economical. This latter being true because high input rate projects may require installation of large volume treating, pumping and producing equipment that are not justifiable for the property in question, if smaller equipment and lower input rates make the project more economical.

Selection of proper input pressures for a flood operation is controlled by certain limits now being accepted by engineers. These limits may be divided into two categories, namely, the effect of pressure on the sand itself and the effect on injection volumes. So far as pressure alone is concerned the minimum pressure is naturally the threshhold pressure, or pressure at the sand face at which the sand will accept water; while the maximum pressure is that which lifts the overburden on, or shears the sand being flooded. The minimum pressure to be used because of its effect on injection volumes is that which puts water into the sand so slowly that water logging takes place with no flooding action resulting, while the maximum pressure is that which injects such large volumes that rapid channeling of water to input producing wells results.

The minimum injection pressure at which a sand will accept water is not safely predictable from core analysis of the input well as yet. Although rough correlations may be made between entry pressures and core data in existing flood projects, wide variation of physical characteristics of most oil sands makes definite predictions impossible. Low permeability and porosity will, of course, increase the entry pressure. However, a certain leeway must be allowed in estimating entry pressures from core analysis. A high percentage of successful water floods to date are in the low permeability and porosity sands found in the eastern states.

The maximum injection pressure is that at which overburden is lifted from the oil sand, or a radial fracturing takes place. This pressure is easily determined, for any input well by running an injection characteristic test and plotting injection volumes against pressures used. When the overburden is lifted, or radial fracturing is experienced, there will be a distinct break in the plotted relationship line. In fact, the graph will represent two distinct lines with the first portion, or line, of the graph starting at the entry pressure and ending at the fracturing or overburden lifting pressure, while the second portion starts at this critical pressure and extends to any pressure applied to the sand face. It is accepted by engineers generally that injection pressures should fall in the first portion of the graph, or between the entry and critical pressure, with general opinion being that the critical pressure should be closely approached for most economical and efficient operations.

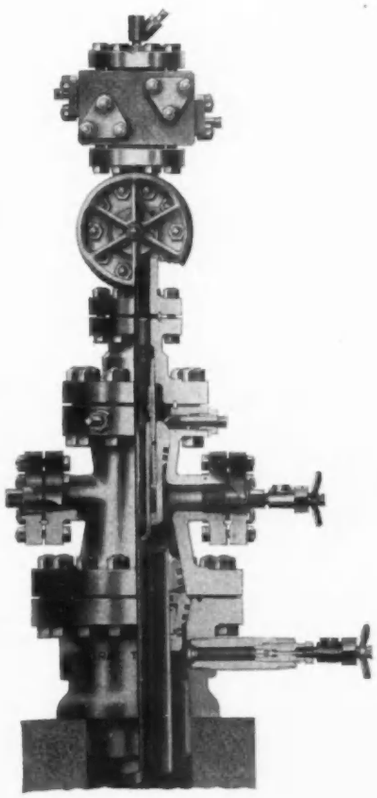
The minimum injection pressure from a volume viewpoint is not so bothersome in the lower permeability and porosity sands as in the ones with the higher values. In a tight sand a slow injection rate should not tend to water log the sand to the degree that it should in the very loose sands. In both cases the minimum injection volume should not be the entry pressure controlled volume, but that which will effectively bank and move oil. This, of course, offers the very obvious conclusion that the minimum and maximum desirable volumes may approximately equal one another.

The injection pressure which gives the maximum volume input is for most practical purposes unattainable in many sands. After the critical pressure is passed, rapidly-increasing volumes of water may be introduced with comparatively small increases in pressure. It has been generally accepted that after the critical pressure is passed any increasing of pressure and corresponding volumes would only result in rapid channeling and consequent uneconomical recycling of input water. However, this latter is a not definitely proved assumption at present.

From the foregoing it may be stated that the minimum pressure to use in flooding is that which will effectively move a bank of oil to an input well in an economically acceptable length of time regardless of the corresponding volume so long as the recovery or flood-

■ CONTINUED ON PAGE 40

SIMPLICITY is the first requisite of well control



Look for the inconsistencies that aren't there!

If a method of completion provides control during one period of the operation and fails to provide it at some other period, it becomes an inconsistent hybrid, actually inferior to the "open hole" method, for it breeds false confidence.

If a method of completion fails to provide for the assembling of equipment needed for the performance of one operation to that needed for the performance of a succeeding operation with control, the result is an intolerable pile of valves, fittings, blowout preventers, etc., filling a cellar and using up valuable space under the derrick floor which is badly needed for the performance of operations.

A method of completion which provides control at certain periods and fails to provide it at others is not a system of well control. The more elaborate or efficient the control is at certain periods, and control not provided at other periods when the need is just as great, the more inconsistent the design becomes. It is inconsistent to provide expensive, fine equipment at one stage of the operation, and depend on one's hat for closing up the well at others!

To qualify as a system of well control, there must be complete control throughout the entire sequence of operations, including the assembling and disassembling of equipment between operations. Gray Systems of Well Control came into being from the clearing house of thought of over 500 methods of completion, an experience and "know-how" gained from 20 years of work to meet all kinds of conditions. There is no gap in control when you use Gray Systems of Well Control. *The whole is greater than any of its parts. Look for the inconsistencies that aren't there!*

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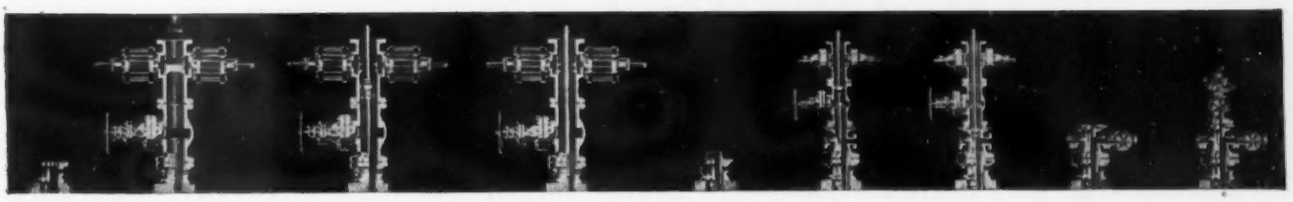


Casing Head Attached | Drilling | Running Casing | Casing Landed | Drilling Control Equipment Removed | Drilling-in and Running Tubing | Tubing Landed | Control Equipment Removed | Manifold Attached

Graph for Estimating Recoverable

IN THE volumetric method for estimating recoverable oil, the following formulae are used.

$$\text{Total pore space (Bbl. per acre-foot)} = \frac{43{,}560 \times \%\ \text{porosity}}{5.6}$$

$$\text{Oil Content (Bbl. per acre-foot)} = \frac{43{,}560 \times \%\ \text{porosity} \times \%\ \text{saturation}}{5.6}$$

$$\text{Recoverable Oil (Bbl. per acre-foot)} = \frac{43{,}560 \times \%\ \text{poros.} \times \%\ \text{sat.} \times \%\ \text{recovery}}{5.6}$$

43,560 = number of cubic feet in 1 acre-foot

5.6 = number of cubic feet in 1 barrel.

The factors of porosity and oil saturation are determined by analysis of cores. The recovery factor is estimated, considering such factors as water drive, gas drive, gas in solution and permeability as shown by the core analysis.

The accompanying graph gives a quick approximate solution of the above equations. Taking as an example a sand having 20 percent porosity and 60 percent oil saturation, let us solve the problem for total pore space, oil content per acre-foot, and for recoverable oil using 25 percent and 50 percent recovery factors.

$$\text{Total pore space } \frac{43{,}560 \times 20\%}{5.6} = 1{,}556 \text{ bbl. per acre-foot.}$$

Graphic Solution: Starting at the bottom of the graph with 20 percent porosity, draw a vertical line to intersect the 100 percent saturation line at the point "E," then draw a horizontal line to the scale at the lefthand margin and read the number of barrels per acre-foot on the scale.

$$\text{Oil Content (Bbl. per acre-foot)} \quad \frac{43{,}560 \times 20\% \times 60\%}{5.6} = 933$$

Graphic Solution: Starting at the bottom of the graph with 20 percent porosity, draw a vertical line to intersect the 60 percent saturation line at the point "A," then draw a horizontal line to the scale at the lefhand margin and read the number of barrels per acre-foot.

$$\text{Recoverable Oil (Bbl, per acre-foot)} \quad \frac{43{,}560 \times 20\% \times 60\% \times 50\%}{5.6} = 467$$

$$\frac{43{,}560 \times 20\% \times 60\% \times 25\%}{5.6} = 233$$

Graphic Solution: From the intersection of the line "AB" with the 50 percent recovery line at the point "C," draw a vertical line to the oil recovery scale at the top of the graph.

From the intersection of the line "AB" with the 25 percent recovery line at the point "D," draw a vertical line to the oil recovery line at the top of the graph.

Flood Injection Pressures

■ CONTINUED FROM PAGE 38

ing mechanism of the water movement in the sand is efficient.

This minimum pressure quite closely, though not exactly, approaches the maximum allowable pressure. The maximum desirable pressure is that which is just short of the critical value which promulgates channeling or break through of water through the oil bank to a producing well.

Somewhere between these two rates is the one which gives the maximum amount of oil recovery in the most economical period of time. It is impossible to calculate this value in advance of actual operations. However, it is probably, although not definitely, the proper pressure to use in flooding.

It seems that water moving through an oil sand is controlled by not only the physical characteristics of the sand and other material, but also the oil and water. Increasing of input rates beyond the maximum outlined does not result in a scouring torrent of water moving through the sand, but only a small increase in linear velocity of radial movement from the well bore. Flooding out of a pattern, even though input to producer distance may only be 200 to 400 feet requires years instead of days. It appears instead that there are certain quantities of resistance in the oil formation which must not be exceeding if efficient flooding is to be realized.

Physical Reaction

The physical reaction taking place when the critical pressure is reached in an input well cannot be explained. One school of thought holds that the overburden between the oil sand and the surface is actually lifted or sheared above the sand, while the other thinks that a radial fracturing or shearing of the sand itself results. The former group is backed by the quite obvious fact that the overburden on any oil sand weighs only so much per square inch on the sand top, dependent upon the overburden density, and that when this weight per square inch is exceeded by water pressure in the sand plus a certain factor for the shearing action the overburden may be lifted.

The latter group is backed in the belief that a shearing of the sand takes place when the critical pressure is reached by the observation in field operations that wells in the same field with about the same amount and nature of overburden have widely variant critical pressures.

Both groups are aware of the fact that many input wells have different critical pressures at various times during their life and that no data are available for definitely predicting critical pressures in a certain well. The definition of critical pressure is lacking but it usually approximates one pound per foot of well depth on the surface. For example a 900-foot well should have a critical pressure approximating 900 pounds on the surface. This figure is accurate enough to use in designing surface equipment and estimating corresponding input and recovery rates.

Flood projects in existence today are in most cases operating at pressures below critical as outlined with volumes corresponding to the pressures. In the pressure range below critical the volumes vary generally from 0 to 15 barrels per foot of pay sand per day with the mean average being between three and ten barrels per foot per day. Pressures usually approximate critical since most operators follow the policy of injecting at just below critical.

Surplus Sales Protection Given Toluene Producers

In a move to protect toluene producers against competition which would seriously disrupt the industry, the War Assets Corporation has ordered its selling agencies to sell only for export, new use or refinery consumption in disposing of the 17,692,000 gallons of government surplus stocks.

The surplus inventory amounts to approximately eight months prewar production, although it is a considerably lesser proportion of the 1945 war swollen output.

In the hope of moving the toluene into refinery use, the WAC has set a price as low as 10 cents per gallon for sales for motor fuel additive or blending agent in lots of a million gallons or more, 11 cents for lots between 500,000 and one million gallons, and 12 cents for smaller quantities.

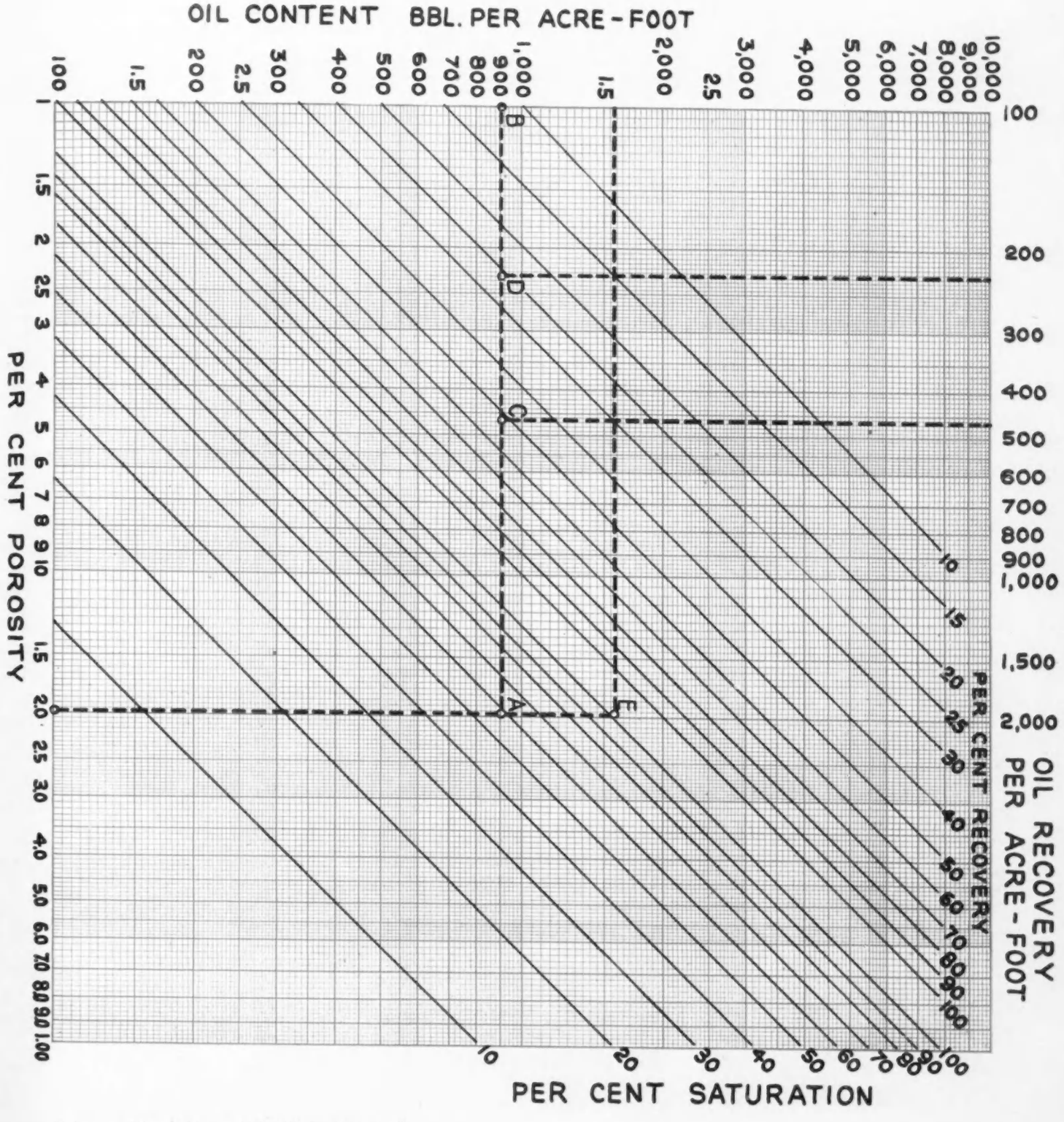
This is only approximately 40 percent of the price at which it is offered for export or for new uses, although it was suggested that lower prices for new uses will be considered if offers are made.

Continental Closes Office

Continental Oil Company has closed its division production office at Evansville, Ind., and C. R. Allen, superintendent, and Ted Steible, clerk, are being transferred to Ponca City, Okla. George Taylor, geologist, and Earl Wooldridge, landman, are to remain in Evansville.

Oil by Volumetric Method

By LYNDON L. FOLEY, Petroleum Engineer and Geologist, Tulsa



Disseminating Secondary Recovery Knowledge

By MARION STEKOLL, Independent Operator, Independence, Kansas

THE independent oil producer is today operating the major share of the secondary-recovery projects in the nation. This is essentially true because under the present market conditions only the operator with low overhead costs can make a fair profit on many operations of this type. Although the independent producers, by avoiding high overhead costs, are able to undertake many projects which otherwise would not be feasible, the low overhead costs mean that many of them are handicapped by lack of an engineering staff and almost all by lack of research facilities and personnel. As a result, the average efficiency of secondary-recovery operations is not as high in most areas as it might be if market conditions were more favorable.

During the past few years, there has been such a shortage of oil-field labor that the secondary-recovery operator in many instances has found it difficult to keep his projects going. Many have found it necessary to take a hand in their operations by filling in on a drilling crew, working as a pumper, etc. Under these conditions, they have not found time to keep abreast of new developments in secondary-recovery methods of production. In many instances, operators are not familiar with work being done just across the fence on problems on which they are working.

Discussions Suggested

These handicaps could be mitigated to a large extent by occasional meetings of the operators in which engineering problems of mutual interest could be discussed freely. Although many do not employ engineers, each is faced with engineering problems that must be solved in some manner. If the information accumulated by each was put into a common pool, an appreciable fund of knowledge would be available to all.

In addition to informal discussions of everyday operating problems, such groups should review and discuss the outstanding papers on secondary-recovery presented at the meetings of the various technical societies and those that appear in the trade journals. At times, the authors of the papers will be available to make the presentation, but when he is not available considerable benefit still may be derived from having one of the group read the paper or give a review of it. Usually one or more of the group will have been present at the original presentation and can give the others the benefit of the discussion that occurred at that time. Occasionally a member of the group, or organization, may have a formal paper to present but the organization should operate in such a manner that membership will in no way obligate the individual operators to contribute time that too frequently they cannot spare from their work.

Further dissemination of such information could be achieved, if papers presented at such regional meetings were offered to the industry's trade magazines for publication. Perhaps not all would be published, but many would be used and thus would be available to all.

At the recent meeting of the American Petroleum Institute and at the Ninth Technical Conference on Petroleum Production at State College, Pa., sponsored by the School of Mineral Industries of Pennsylvania State College, many excellent papers relating to secondary-recovery problems were presented. Although both meetings were well attended in spite of the difficulties of traveling these days, the percentage of secondary-recovery operators from any particular area that were present was small indeed. If the operators in each area would review these excellent papers and discuss how the findings presented apply to local conditions, greater strides would be made in the recovery of oil by stimulative methods of productions.

Benefit to All

The value to be derived from such group meetings will be dependent on the percentage of the engineers, operators and technicians in the area that will attend the meetings and contribute to the discussions from their experience. Probably the greatest benefit will be obtained by the smaller operators, but anyone engaged in secondary-recovery work certainly will profit by discussions of problems common to all in the area.

To the writer's knowledge, in most areas, there are no such meetings of the secondary-recovery operators as are described above. The Pennsylvania operators are more fortunate than those in other sections of the country as they have opportunities to compare notes through the activities of the Pennsylvania Grade Crude Oil Association, the meetings of the Eastern District of the API Committee on Production Technology, and the Technical Conferences sponsored by Pennsylvania State College. A few years ago, 12 or 15 secondary-recovery operators in Eastern Kansas met occasionally to discuss their problems but the organization is no longer active, although some of the group indicated they derived considerable benefit from the meetings. There also was a group in the Nowata, Okla., area that met occasionally to compare notes but it is understood that they are no longer active as a group. The area from Tulsa to Ottawa, Kans., could be served well by one organization without placing a hardship on anyone if the meetings were rotated between several towns in the area, such as, Nowata and Independence, Chanute and Ottawa, Kans. Similar arrangements could be worked out in other areas.

It would be best for such meetings to restrict their agenda to technical matters for if matters of policy and those of a political nature are considered it is likely that the organization soon will lose sight of its original objective. The Independent Petroleum Association of America, the National Stripper Well Association, the Mid-Continent Oil and Gas Association and others are already actively engaged in work relating to policy. The need of the secondary-recovery operator is local organizations in which he may discuss and study his engineering problems.

Occasional meetings of secondary recovery operators to discuss mutual problems would be of great benefit

Anadarko Basin Holdings Are Enlarged by Stanolind

Stanolind Oil and Gas Company has added 30,000 to 40,000 acres to its extensive lease holding in the Anadarko Basin of Southwestern Kansas. Agents for the company purchased a block of approximately 32,000 acres in townships 31s-28w, 31s-29w, 32s-28w, 32s-29w, 32s-28w, 32s-29w and 33s-29w.

In 1933 and again in 1936 Stanolind did considerable seismograph work in Meade County and adjoining areas and during the past year has checked the entire area with core drill.

Poll on Oil Matters

The United States Chamber of Commerce is taking a referendum of its members on a number of fundamentals relating to natural resources, including the promotion of prospecting for oil and gas and the acquisition of land by the federal government, the ownership of the tidelands and other related matters.

GOVERNMENT-OWNED REFINERIES and ACCESSORY FACILITIES

FOR SALE OR LEASE

The War Assets Corporation, a subsidiary of RFC, has been designated as a disposal agency by the Surplus Property Administration and invites proposals for the purchase or lease of the following properties in the interest of continued employment. These properties were acquired by the government for production in the war effort, and are now, or shortly will be, declared surplus to government needs. Listing of these plants by name of lessee is for identification purposes only, and has no connection with the lessees' own plants or facilities.

These six refineries with storage facilities were built during the war to help meet the large requirements for 100 octane aviation gasoline.

Oil City, Pennsylvania (Plancor 1044)
Pennzoil Company

Two major refinery units and necessary auxiliaries for the production of 100 octane gasoline components. Area of site 8 4/5 acres. Approximate capacities are:

1. *HF Alkylation Unit: Capacity 1500 barrels of aviation alkylate per day.*
2. *Gas Concentration Unit: Capacity 850 barrels of base stock per day.*

Storage tankage:
Atmospheric: 123,000 barrels
Pressure: 13,000 barrels
Two sidings, Pennsylvania R. R.

●

El Dorado, Arkansas (Plancor 689)
Root Petroleum Corp.

A complete refinery with an operating capacity of about 1,990 barrels of 100 octane gasoline per day. Can be converted to the production of lower grade gasolines. Area of site, 7½ acres. Major functional units with approximate capacities are:

1. *Fluid Catalytic Cracking and Gas Concentration Unit. Capacity: 4,600 barrels of gas oil charge per day.*
2. *Butane Isomerization Unit. Capacity: 250 barrels of isobutane per day.*
3. *HF Alkylation Unit. Capacity: 1,300 barrels of aviation alkylate per day.*

Storage tankage:
Atmospheric: 234,000 barrels
Pressure: 22,000 barrels
Missouri Pacific R. R. siding.

●

Catlettsburg, Kentucky (Plancor 1067)
Ashland Oil & Refining Co.

A refinery with operating capacity of about 5,300 barrels of 100 octane gasoline per day. Area of site 101 acres. Major operating units with approximate capacities are:

1. *Thermofor Catalytic Cracking and Treating Unit, and Gas Concentration or Feed Preparation Unit. Capacity: 10,000 barrels of virgin gas oil or equivalent reduced crude per day.*
2. *HF Alkylation Unit. Capacity: 3,000 barrels of aviation alkylate per day.*
3. *Butane Isomerization Unit. Capacity: 1,300 barrels of isobutane per day.*

Storage tankage:
Atmospheric: 471,000 barrels
Pressure: 29,000 barrels
Chesapeake and Ohio R. R. spur.

●

Sweeny, Texas (Plancor 880)
J. S. Abercrombie Oil Co. & Harrison Oil Co.

Consists of refinery, 2 terminals, and 2 tank farms. Refinery has a rated capacity of about 8,500 barrels of 100 octane gasoline, 3,500 barrels of Army All Purpose Gasoline, and 1,700 barrels of 91 octane gasoline per day. Is readily convertible to production of other grade gasolines. Site consists of 7 parcels of land totalling approx. 508 acres. Operating units with approximate capacities are:

1. *Crude Topping Unit. Capacity: 22,000 barrels per day.*
2. *Thermal Reforming Unit. Capacity: 7,000 barrels per day.*
3. *Fluid Catalytic Cracking Unit. Capacity: 13,000 barrels of gas oil per day.*
4. *Gas Concentration Unit. Capacity: Consistent with operation of other units.*
5. *HF Alkylation Unit. Capacity: 4,000 barrels of depentanized alkylate per day.*
6. *Isomerization Unit. Capacity: 1,500 barrels of isobutane per day.*
7. *Acid Treating Unit. Capacity: Consistent with operations of other units.*

Storage tankage:
Atmospheric: 2,096,000 barrels
Pressure: 118,000 barrels
St. L. B. & M. R. R. siding. Oil loading docks at San Bernard and Freeport Terminals.

●

Cheyenne, Wyoming (Plancor 1146)
Frontier Refining Corp.

A complete refinery with designed capacity of about 1,650 barrels of 100 octane gasoline and approx. 1,300 barrels of motor gasoline per day. Area of site, 25 acres. Operating units with approximate capacities are:

1. *Crude Unit. Capacity: 2,200 barrels per day.*
2. *Reforming Unit. Capacity: 1,500 barrels per day.*
3. *Fluid Catalytic Cracking Unit: Capacity: 2,300 barrels of gas oil per day.*
4. *Butane Isomerization Unit. Capacity: 425 barrels of isobutane per day.*
5. *HF Alkylation Unit. Capacity: 1,100 barrels of depentanized alkylate per day.*
6. *Gas Concentration Unit. Capacity: Consistent with production of other units.*

Storage tankage:
Atmospheric: 250,000 barrels
Pressure: 16,000 barrels
Union Pacific R. R. siding.

●

Salt Lake City, Utah and
Fort Laramie, Wyoming (Plancor 1164)
Utah Oil Refining Co.

Refinery at Salt Lake City, capacity about 5,500 barrels of 100 octane gasoline per day; can be converted to production of commercial grade gasolines. Area of site, 27¾ acres. Major units with approximate capacities are:

1. *Fluid Catalytic Cracking and Vapor Recovery Unit. AGAC Capacity: 8,500 barrels per day.*
2. *Sulfuric Acid Alkylation Unit. Capacity: 3,000 barrels aviation alkylate per day.*
3. *Butane Isomerization Unit. Capacity: 1,000 barrels per day.*
4. *Naphtha Fractionation Unit. Capacity: 5,000 barrels per day.*
5. *Naphtha Isomerization Unit. Capacity: 1,500 barrels per day.*
6. *Hydrogen Generation Unit. Capacity: 350 thousand cubic feet per day.*
7. *HCL Generation Unit. Capacity: Consistent with requirements of naphtha isomerization unit.*

Storage tankage:
Atmospheric: 410,000 barrels
Pressure: 57,000 barrels
Union Pacific R. R. siding.
FACILITIES AT FORT LARAMIE consist of special storage tankage:
Atmospheric: 25,000 barrels
Pressure: 15,000 barrels
Area of site, 4¾ acres.
C. B. & Q. R. R. siding.

OTHER GOVERNMENT-OWNED OIL REFINERIES ARE NOW, OR SHORTLY WILL BE, AVAILABLE FOR SALE OR LEASE.

Information regarding these plants is available in the Washington office of the War Assets Corporation and inquiries should be directed to the Plants Disposal Division. All data contained herein are necessarily abbreviated and subject to correction. They are not intended for use as a basis for negotiations. WAR ASSETS CORPORATION reserves the unqualified right to reject any or all proposals or offers received for the above properties.

ADDRESS YOUR INQUIRIES TO:

WAR ASSETS CORPORATION (RFC)

PLANTS DISPOSAL DIVISION

811 Vermont Avenue, N. W. Washington 25, D. C.

224T

Tax Review

A Regular Feature of THE OIL WEEKLY

By WILLIAM O. TAYLOR*

This column is designed to review legislation, judicial decisions, administrative rulings and policies, and topics which are of current interest to the oil industry, from a tax viewpoint. It will be published as frequently as new developments seem to require.

Unitization Agreement Treated As An Association Taxable As A Corporation

The government has taken the position that the agreement for unitization of the East Alice field has the same effect tax-wise as if the parties thereto had formed a corporation and had contributed their holdings in the field to such corporation. As a result, the entire unit operation, designated as the East Alice Operating Committee, has apparently been assessed with a deficiency in corporation taxes, including the excess profits tax, and the participating operators, as individuals, have been assessed a tax on the theory that amounts which they received from the operations were dividends. Some, if not all, of the operators have filed petitions with the Tax Court, contesting the government's position.

Under the Internal Revenue Code, the definition of "corporation" includes, among other things, an "association." Exactly what is an association has been the subject of much litigation, the results of which have been rather unsatisfactory from the standpoint of establishing a workable rule. The court decision most frequently cited on this question is *Morrissey v Commissioner, 296 U. S. 344,* by the Supreme Court of the United States, a case not involving oil operations. It was said, in that case, referring to the statutory definition of "corporation," that "the inclusion of associations with corporations implies resemblance; but it is resemblance and not identity." The Court said, too, that the definition undoubtedly includes so-called common law associations, which it defined as "a body of persons united without a charter but upon the methods and forms used by incorporated bodies for the prosecution of some common enterprise." The following features which are characteristic of the corporate entity and which to some extent furnish the tests for determinging whether some common enterprise, not in fact a corporation, shall nevertheless be treated as a corporation for tax purposes, were set out: (1) an entity (e.g. a trust) separate from the participants in the joint enterprise, to hold title to the propery; (2) cenralitzation of management of the enterprise; (3) continuity of the enterprise, i.e. the joint arrangement does not end at death of one of the participants or by reason of transfer of the interest of a participant; (4) limitation of personal liability of the participants.

In most instances where a joint enterprise for ownership or operation of oil properties has been held to be a corporation for tax purposes, the oil properties have been owned by a trustee. A typical example is where the owner of a lease executes an instrument declaring himself trustee of the property and then sells beneficial interests in the income from the property, after all expenses have been paid. In such case, the trustee usually has complete control and management of the property, the beneficial interests are transferable, and the owners of such interests are not personally liable for any expenses incurred in developing or operating the properties. In other cases, a group of persons has pooled resources to undertake some oil venture and has for convenience, taken the properties in the name of one or more of them as trustees, with powers in such trustees as outlined above. Such arrangements have almost invariably been held to constitute taxable associations.

On the other hand, there have been numerous cases in which control and management have been centralized in a so-called trustee but in which it has been held that the arrangement did not constitute a taxable association. In these cases, the controlling factors have been: (1) a determination that the participants owned undivided interests in the oil properties (rather than beneficial interests under a trust arrangement) and were therefore tenants in common; (2) a determination that the so-called trustee was in fact no more than an agent of the participants, and that the agency relationship was an outgrowth of individual agreements with the several participants rather than a single agreement with them as a group. In several such cases, it has been determined also that there was no limitation of personal liability of the individual participants.

Each case stands or falls on its own facts. It is not necessary that all the likenesses to a corporation be found to exist in any single instance. In one case, it has been held that limitation of liability need not be present if there are other factors pointing to a likeness to a corporation. In another, a taxable association was found to exist even though there was no formal trust agreement. In yet another, it is said that a determination that the participants are tenants in common does not necessarily preclude a finding that a taxable association exists.

Although, in most cases involving oil operations which have been won by the taxpayers, the courts have stressed the fact that the individual participants owned undivided interests in the properties and were tenants in common, the writer is of the opinion that taxpayers should not rely too strongly on this theory. Recently, there appears to be a decided trend in the courts to give less weight to bare ownership of property and more weight to the right to manage and control it. This trend is particularly noticeable in the cases involving taxability of trust income and estate taxes, and was at least partly responsible for the recent decision involving community property.

Due to the great strides which have been made in gas unitization and due, also, to more rigid requirements as to well spacing, etc. under conservation statutes, there undoubtedly will be a great many more unitization agreements in the future than in the past. Necessarily, they are more comprehensive than the usual form of operating agreement and, by their very nature, they merge even more completely in the joint enterprise the rights of the individual participant. The outcome of the controversy in the East Alice field will in all probability largely determine the attitude of the government in the case of other unitization agreements.

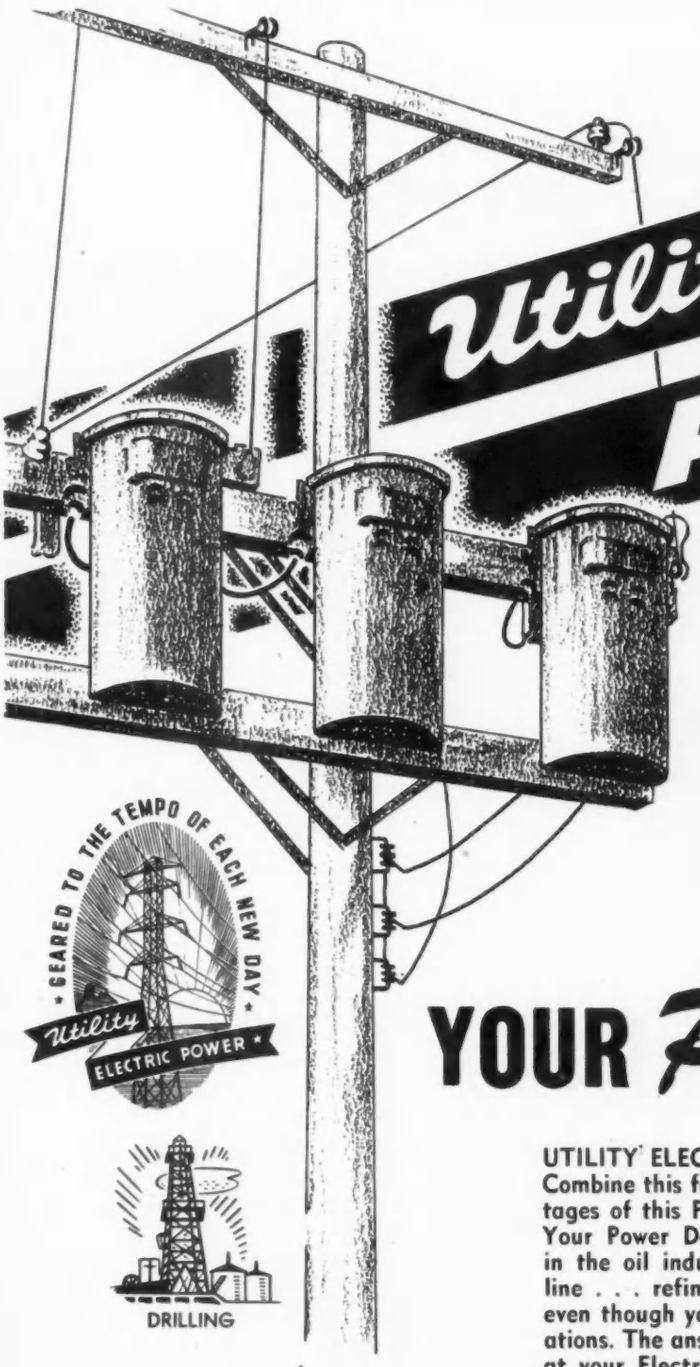
However, even if the government wins the East Alice cases, it will not follow that the same result will be reached in every instance of unitization. In tackling any new situation, the government usually holds its fire until it finds a case involving facts which seem to be particularly in favor of the government's position, and doubtless the strategy has been such in this case. The outcome remains to be seen, but there are some provisions in the East Alice agreement which aren't going to be too easily explained away.

In addition to the undesirable tax consequences of being taxed as corporations, unitized operations present many other tax problems. One of them, which bears on the amount of depletion allowable, is the question of how many depletable "properties" are involved in such a project. Where each participant continues to own his leases which are pooled or where there are cross-assignments between the participants, it can be argued with some force that there are at least as many properties as there were prior to the unitization. The government, however, is apparently taking the position that this is only a single property under the unitization agreement. The amount of the depletion deduction could be materially different under the two views.

Another troublesome question is the proper treatment to be given to the charges and credits which result when, under a common provision in such agreements, a new area is brought into the pool, resulting in adjustments between the participants for prior income and expenditures. The government seems to be toying with the idea that such adjustments as between the participants constitutes an exchange of similar properties on which the gain, if any, is limited to the amount of cash which a particular participant may receive by reason of the adjustment. This position necessarily involves the troublesome question of determining the value of the unitized area at the time of each adjustment of interests.

A more realistic view is that the adjustment is no more than a retroactive redistribution of prior earnings and expenses, but the practical difficulty here is that a taxpayer will be currently credited with income on which the full depletion allowance will already have been deducted and will be charged with drilling costs which have also already been deducted.

* The author is a member of the firm of Butler, Binion, Rice & Cook.



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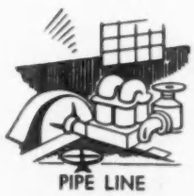
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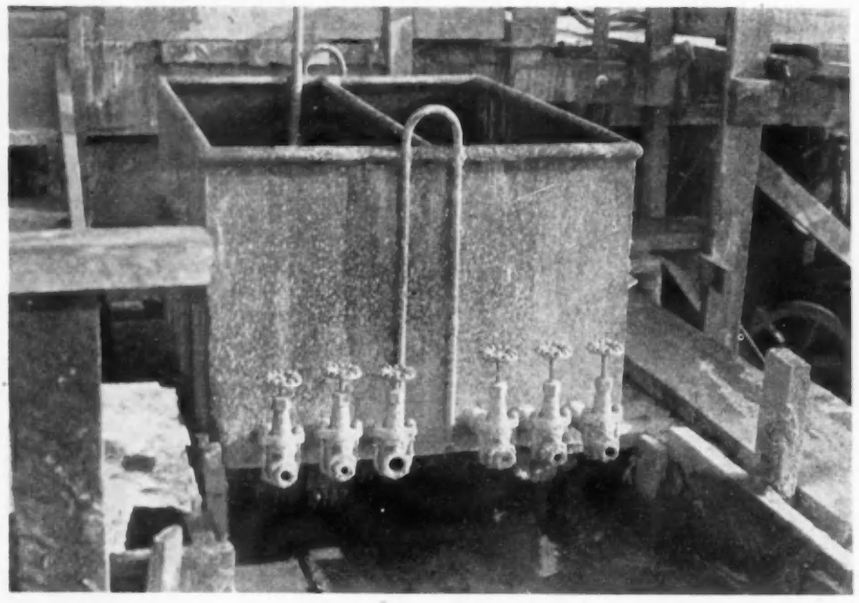
Pipe Bushings Serve as Variable Orifices to Regulate Chemical Flow Into Mud

With the advance of scientific knowledge and information relating to mud control there has also developed a need for more precise field methods of measuring and distributing chemicals into the mud stream. One drilling contractor has achieved this end with a unique and practical tank and valve device which is easily transported from one well to another. It consists of a rectangular open steel tank partitioned off into two sections, and supported on planks laid across the mud return flow ditch just downstream from the well discharge. In the downstream end of the box were installed six 1-inch gate valves, three in each of the two compartments. Bushed down to whatever size outlets are desired — from 1-inch down to ¼-inch — these fittings permit feeding in of chemicals at a constant rate and are not dependent upon the guess of the attendant in pinching down the valve gate. Allowing the gate valve to remain wide open also tends to eliminate possibility of obstructions lodging in the gate seat or leak due to turbulence that would be caused in a partially-opened valve. Not only are the streams evenly and easily regulated to the proper size, but they are partitioned evenly over the mud flow, causing materials to be more evenly distributed in the mud returns. Use of a two-compartment tank also permits the mixing of more than one batch or type of chemical, one being circulated into the stream while the other is being mixed for immediate or stand-by use.

MUD STREAM CONDITIONING



The tank is fitted with a pair of lifting eyes which facilitate its being handled in the field. Pipe edging along the top of the tank and partition stiffen it and eliminate sharp edges of the siding material.

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See Pages 2450 to 2455, Composite Catalog.

PENBERTHY INJECTOR CO.
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Rig Builders' Posts Speed Trying of Light Lines

Considerably speeding up work for rig builders is the time-saving system utilized by one company for snubbing the several light ropes that are employed in rigging sky and basket lines. Instead of wrapping the end of line around any convenient projection near the rig base, a fitting was made which can be bolted quickly to any convenient hole in one of the small steel plates making up the derrick-leg footing. The post is T-shaped, a short bolt or stud being welded to the center of a light pipe handle.

HANDLING CORDAGE

The bolt is secured to the plate with a nut and washer, the handle portion being placed in a vertical position when attached to the rig in the manner shown. With this device one or several light lines may be lashed down quickly and with little chance of slipping as might happen when securing to any chance anchor elsewhere on the rig or ground. Several of these light snubbing posts are carried with each crew and as soon as the base or footing members are rigged up the posts are fitted on to be used throughout the remainder of the job.

DRILLING HINTS

Dual Purpose Engine Reduces Equipment Needed at Rig

AUXILIARY EQUIPMENT

Effective use of a single-cylinder gasoline engine is made by one drilling contractor who, when purchasing equipment, secures the unitized engine and centrifugal pump for unwatering cellars and other high-volume, low-lift pumping needs. Since the handling of large volumes of water is at the worst only an occasional chore around the rig, the engine also serves as drive for the shale shaker, the frame at the head of the latter unit being so designed as to take the engine base skid with provision for locking it at the desired distance to insure driving tension on the shaker Vee belts.

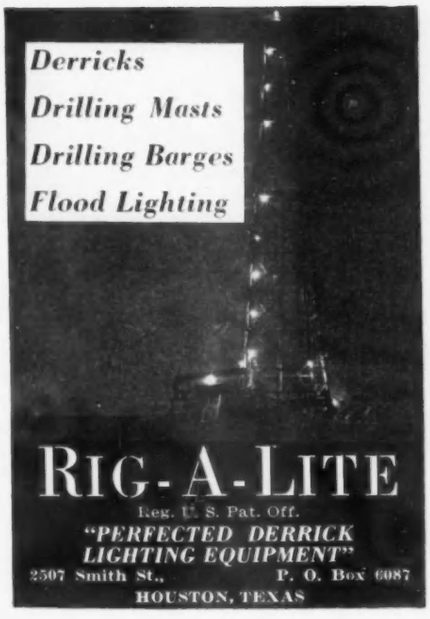
The entire engine skid is removable, or adjustable within limits of belt stretch, simply by turning two screws which project through the overhanging lip of the shaker stand frame, and which bear against the matching flange on the engine base.

Horizontal Pipe Base and Vertical Sockets Form Rack

STORING TOOLS

A simple, inexpensive but practical type of tool rack to be used on the drilling floor may be made from a short length of 3-inch pipe, mounted horizontally on four short pipe legs. On the top side of the pipe is welded a row of six 1½-inch pipe nipples, these varying in length according to the type or size of tools that probably will be used. Tools of such extremes in length as a wire brush and a 36-inch pair of chain tongs are easily racked on this device with little fear of its becoming top heavy and tipping over. Its widely spaced legs permit it to be spotted at any convenient place on the floor, roughness of planking or presence of slippery materials having little effect on its stability.

$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas



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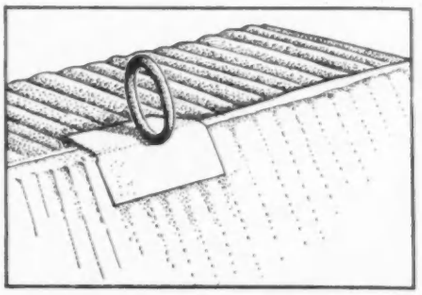
Welded-On Lifting Eye Simplifies Tool House Shifts

The shelter used for the tool pusher, and for the crew during inclement weather while not actually at work on the floor, usually suffers more damage being loaded for a move and being set up at the next location than during all the remainder of the time it is in use.



LOADING DEVICE

One contractor, to avoid the damage which sometimes occurs when a winch or derrick line is looped around the house to permit it to be lifted onto the truck, uses a house having an all-welded frame of salvaged pipe, with the hip roof members braced to a common point at the center of the ridge pole. At this point is welded a heavy steel ring, care being taken to locate the ring at the balancing point of the house so that it will swing on a level keel when elevated.

The corrugated roofing of the shelter is protected against damage from the hook used for lifting by providing a cover plate which overlaps the steel sheets and which is welded to the base of the ring. In this manner the lifting eye is reinforced and the junction of ring and shelter frame is weatherproofed.

Bin With Removable Side Also Serves as Rig Floor

Where skids or other improvised containers are used to transport subs, tongs and other equipment between locations, usual practice is to remove them, piece by piece, and to store them ready for use on the derrick floor.

FLOOR EXTENSION

One contractor, operating a jackknife rig, fabricated strong bins from pipe and salvaged tank plate, forming base, both ends and one side as a solid unit, but making the other or fourth side detachable and normally held in place only by dowelled pins through the base sill and sockets welded to the tops of the corner posts.

When loading equipment, the skid is completed by setting in the fourth side. The bin is then loaded as usual with such containers, being dragged aboard the truck for transfer. Arrived at the new rig, however, the skid is set down at the edge of the working floor and in effect becomes an extension thereto. The skid is set so that the removable side is toward the working space, and when that part is removed, the tools, equipment and accessories are immediately at hand for the drilling crew. As the equipment is used, the edge of the bin nearer the rig is cleared, affording that much additional space to the crew.

To stiffen the sides of this carrier, heavy steel loops are welded to the top pipe members, and chain and boomers used to take part of the strain thrown against the sides by the load within the walls.

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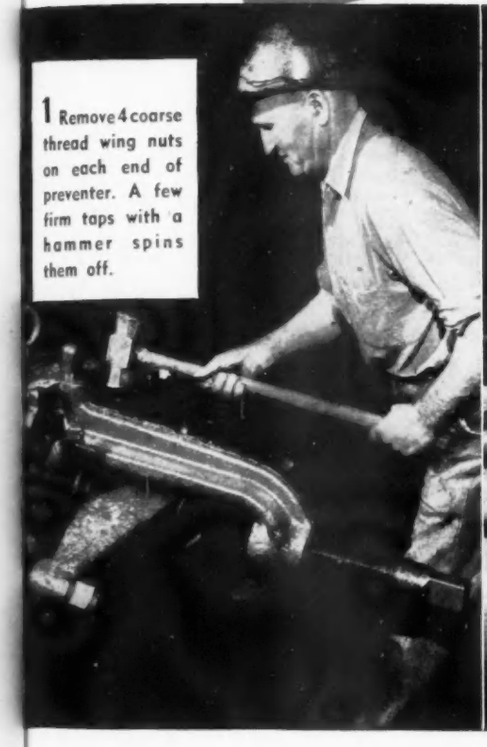
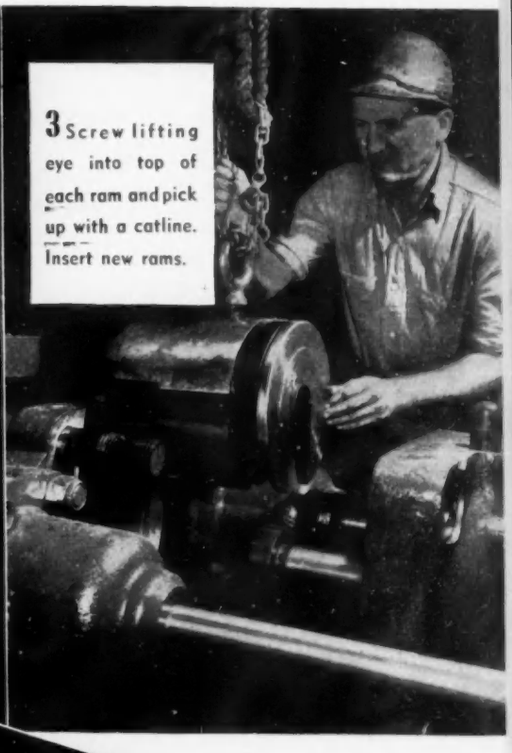
Quick Ram Change

The Entire Operation Requires Only a Few Minutes!



1 Remove 4 coarse thread wing nuts on each end of preventer. A few firm taps with a hammer spins them off.

2 Turn the fluid pressure operation control valve to "open" position to withdraw rams from preventer body.



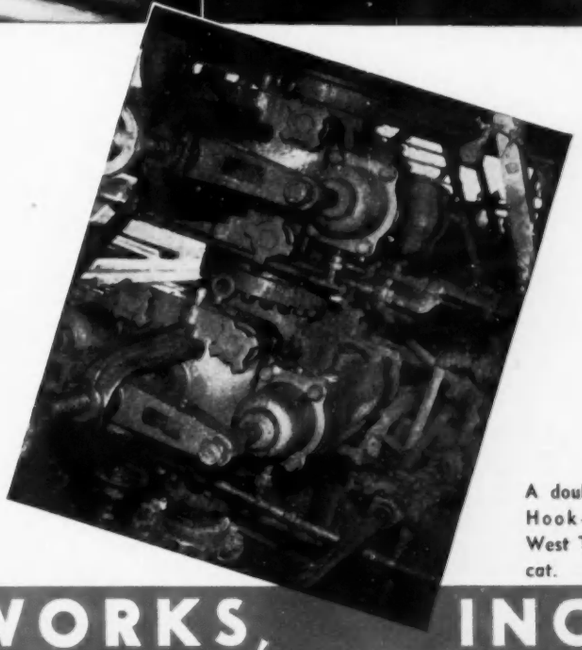
3 Screw lifting eye into top of each ram and pick up with a catline. Insert new rams.

Any "oil field hand" who has ever changed a set of blowout preventer rams will find it hard to believe that the largest size rams can now be changed in a few minutes time . . . unless he is familiar with Cameron's new "QRC" model. Actually, the change requires only (1) the loosening of four hammer lug nuts on each bonnet, (2) turning a pressure control valve to "open" position, thus withdrawing the rams from the preventer body, and (3) lifting straight up on the rams with the catline. These simple operations in reverse order complete the ram change.

Of equal importance is the fact that the new "QRC" model provides an eight-to-one ratio of closing pressure to well pressure, that is, 1000 lbs. closing pressure will close the rams against approximately 8000 lbs. well pressure. This more favorable ratio is made possible by a unique by-pass on the lower side of the rams which diverts well pressure to the rear of the rams as an aid in closing.

In addition to these and other entirely new but proven mechanical features, the Cameron Type "QRC" Pressure-Operated Blowout Preventer makes generous use of features of earlier Cameron models, including the famous Cameron patented self-feeding ram packing element which permits pipe movement and/or rotation thru the closed rams while heavy mud is circulated to subdue "Kicking" pressures.

Complete details will gladly be sent to interested operators on request.



A double "QRC" Hook-up on a West Texas wildcat.

CAMERON IRON WORKS, INC.

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Crude Runs to Stills Register Sharp Gain and Production Rises Moderately

Crude runs to stills at U. S. refineries increased considerably in the week ended February 16, and production of crude oil was upped moderately from the previous week. The production of all principal refinery products was increased, as were their stocks, with the exception of distillate fuel oil, whose stocks show a heavy withdrawal. These trends were revealed by the latest weekly report of the American Petroleum Institute.

The net result of these trends of operations is a continued heavy accumulation of gasoline stocks in storage, and a depletion of distillate fuel stocks by over a million barrels, in spite of increased production of that product.

Production of crude oil in the U. S. averaged 4,710,000 barrels daily in the week ended February 16. That average is 20,000 barrels above the previous week and 71,000 barrels or 1.5 percent less than the same week a year ago.

Crude runs to stills averaged 4,643,000 barrels per day, or 131,000 barrels daily over the previous week's average and 192,000 or 4 percent over the 4,835,000 barrels per day averaged in the comparable week of last year.

Refinable crude stocks were reported to be 223,303,000 barrels, as of February 9, by the U. S. Bureau of Mines. These stocks are 1,048,000 barrels less than those reported for the previous week and 4,409,000 barrels or 2 percent greater than the stocks held February 10, 1945.

Production of gasoline, including natural gasoline blended at refineries, rose 1,148,000 barrels from the previous week to 14,002,000 barrels for the week ended February 16. Compared with the same week a year ago that production was a drop of 1,247,000 barrels or 8.2 percent from 15,249,000. Stocks of finished and unfinished gasoline continued to rise, being raised by 1,281,000 barrels to a new high for the year of 105,233,000 barrels. These current stocks are 9,860,000 barrels or 10.3 percent more than those held on February 17 a year ago.

Distillate fuel oil production of 5,776,000 barrels for the week ended February 16 was 126,000 barrels over that for the previous week, and 536,000 barrels or 10.2 percent more than production for the same week in 1945. Stocks of distillate fuel were reduced by 1,028,000 barrels, bringing total stocks down to a new low for the year of 27,273,000 barrels, and showing a loss of 1,514,000 barrels or 5.3 percent under stocks held at the same time last year.

Production of residual fuel oil was increased 183,000 barrels to a new figure for the week ended February 16, but was off 577,000 barrels or 6.1 percent in comparison with a year ago. A considerable amount of 481,000 barrels was sent to storage during the week, bringing the residual stocks to 40,036,000 barrels. That quantity was, however, 8,114,000 barrels or 16.9 percent less than stocks of February 17, 1945.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	47,187	11-27	72,881	1- 2
1944	4,762	9-30	4,798	12-30	240,992	1- 1	89,162	4- 1	48,162	10-28	64,744	10- 7
1945	[1]4,944	7-14	[1]5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	4,710	2-16	4,651	1- 5	224,351	2- 2	105,233	2-16	35,199	1- 5	42,371	1- 5
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 3
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,382	4-12	90,914	7-13
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-18	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	220,258	9- 9	76,302	1- 1	30,232	4-19	49,737	3-18
1945	3,621	10- 6	3,409	10- 6	[4]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,548	1- 5	4,498	1-12	218,193	1- 5	98,494	1- 5	27,273	2-16	39,086	2- 2

TRENDS OF 1945 AND 1946

Trends in Week Ended:	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1945:									
January 27	4,727	4,756	221,310	14,957	88,223	4,843	33,561	9,252	51,119
February 24	4,777	4,803	219,351	15,500	95,972	4,958	28,753	9,084	46,713
March 31	4,781	4,677	223,782	14,644	98,758	4,548	26,889	9,184	41,745
April 28	4,805	4,780	223,474	14,633	94,068	4,636	28,273	9,379	39,813
May 26	4,887	4,950	222,831	15,194	89,121	4,667	29,184	9,670	38,548
June 30	4,903	4,999	220,781	15,546	86,472	4,910	32,213	9,077	40,488
July 28	4,930	4,996	218,507	16,106	86,008	4,598	36,071	9,586	42,283
August 25	4,892	4,931	[4]211,813	15,986	84,693	4,960	39,782	9,356	46,201
September 29	4,357	3,812	222,387	11,913	79,552	3,940	43,689	7,047	46,853
October 27	4,273	4,838	224,230	15,530	74,335	5,159	43,472	8,691	45,943
November 24	4,469	4,648	219,363	15,681	83,184	4,802	45,258	8,800	47,474
December 8	4,459	4,473	218,355	14,908	87,004	4,669	42,406	8,545	44,743
December 15	4,515	4,562	219,518	14,644	89,043	4,905	40,968	8,107	42,962
December 22	4,480	4,511	220,288	14,768	91,870	4,708	38,919	8,539	41,479
December 29	4,474	4,729	218,918	14,546	95,205	5,055	36,651	8,765	42,447
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,293	35,199	8,867	42,371
January 12	4,578	4,498	219,219	14,246	99,574	5,325	33,359	8,223	40,499
January 19	4,606	4,627	219,709	13,979	100,778	5,295	31,403	8,563	40,557
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 2	4,609	4,530	224,351	13,841	103,125	5,636	28,939	8,506	39,086
February 9	4,690	4,512	223,303	12,854	103,952	5,650	28,301	8,630	39,555
February 16, 1946	**4,710**	**4,643**	.....	**14,002**	**105,233**	**5,776**	**27,273**	**8,813**	**40,036**
February 17, 1945	4,781	4,835	[5]218,894	15,249	95,373	5,240	28,787	9,390	48,150
Change:									
In week	+20	+131	—1,048	+1,148	+1,281	+126	—1,028	+183	+481
In year	—71	—192	+4,409	—1,247	+9,860	+536	—1,514	—577	—8,114
In year	—1.5%	—4.0%	+2.0%	—8.2%	+10.3%	+10.2%	—5.3%	—6.1%	—16.9%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, February 10, 1945.

M.B.K. Stock Bought

Roeser-Pendleton, Inc., Fort Worth, has exercised an option taken some weeks ago for the purchase of 33⅓ shares of the outstanding stock of the M. B. K. Drilling Company, Tulsa, at $6380 per share. A similar price was recently paid for the other 66⅔ shares by the Kerlyn-McGee Oil Interests, owned by Gov. Robert S. Kerr and Dean A. McGee, both of Oklahoma City, and the Big Chief Drilling Company. M. B. K. Drilling Company owns ten leases in Ector and Gaines counties, West Texas, with a gross allowable of 1500 barrels daily, and 12 rotary rigs. A directors meeting has been scheduled to elect new officers.

40-Acre Spacing Asked

Gulf Oil Corporation has asked the Oklahoma Corporation Commission for 40-acre well spacing in the new Coffee Creek oil pool, northeast of Edmond, Oklahoma County, Okla., Gulf opened the pool late last year at Beck 1, CSW SW 15-14n-2w, which flowed 70 barrels of oil plus 1½ million cubic feet of gas from Hunton lime at 5456-89 feet. Operators estimate the producing area will include 7680 acres to make it one of the largest fields discovered in Oklahoma in some time. Gulf asks that subsequent wells be located in the northeast quarter of each 40-acre square with exceptions for wells already drilled off the pattern.

FPC Told Plans for 400-Mile, 26-Inch Kansas-Missouri Natural Gas Line

Plans for a 400-mile, 26-inch natural gas line from Liberal, Kan., to Kansas City, Mo., which with two 50-mile, 26-inch lines within the field and two main compressor stations at Liberal and Wichita, Kan., respectively, will cost $25,620,000, with an additional $3,340,000 required for additional facilities in the first five years, have been submitted to the Federal Power Commission by the Mid-Continent Gas Transmission Company.

Designed to furnish gas to distributing companies and industrial customers in Kansas City and Wichita, the project will be supplied from a reserve estimated at not less than 1 trillion cubic feet to be provided from more than 114,000 acres of reserves in Stevens and Seward counties, Kansas, and Texas County, Oklahoma, which the Peerless Oil and Gas Company is prepared to dedicate, and by additional gas purchase contracts with holders of gas acreage which are now being purchased. The reserves to be secured, it was stated, are deemed sufficient to supply the present and proposed markets of the company for a minimum of 40 years.

The commission also has received an application from the Cincinnati Gas Transportation Cmpany for authority to construct a 70-mile, 14-inch pipe line from its present 20-inch line near Foster, Ky, to an interconnection with the 24-inch line of the Tennessee Gas and Transmission Company near Means, Ky., to cost $1½ million and to be completed by November 1.

The project is designed to augment the capacity of existing facilities by 50 million cubic feet per day for delivery to meet increased demands of Cincinnati Gas and Electric Company and Union Light, Heat and Power Company. The additional gas is to be supplied by Tennessee Gas and Transmission Company for the account of United Fuel Gas Company.

Stanolind Orders 35-Mile, 16-Inch West Texas Line

Stanolind Pipe Line Company has placed orders for the construction of 35 miles of 16-inch pipe to extend its West Texas-Drumright, Okla., 16-inch trunk line from Sundown station in the Hockley County sector of the Slaughter field to the Wasson field. The Sundown-Drumright unit is currently pumping 63,000 barrels daily, with a rated capacity of 66,000 barrels daily using a single intermediate station. This oil is obtained from the Slaughter and adjacent fields through its own and outside connecting lines, and contains an excessive volume of salt. The inclusion of Wasson, Waples-Platter and Ownby regular Permian oil and Wasson deep production will afford the company's refinery outlets in the Mid-west with some relief from the mechanical and treating problems.

Stanolind built a pump station in NE¼ Sect. 868, Yoakum County sector of the Wasson field, and a ten-mile, eight-inch discharge line due east to connect with Magnolia's eight-inch carrier in April, 1944, to supplement its Slaughter field runs as a wartime emergency. The company acquired Humble Pipe Line Company's Wasson, Waples-Platter and Ownby gathering system and well connections late last year, thus assuring an ample supply of oil.

The entry of Stanolind into the Wasson area with a 16-inch line paves the way for the early extension of its carrier to the Fullerton and other sweet-crude areas in Andrews County, where Stanolind Oil & Gas Company is a substantial producer. Also, the extension of the line to Ector County, where 20,000 barrels daily of controlled production is held, is inevitable. Other trunk lines serving the district are successfully batching premium-priced sweet crude along with sour oil without contamination, and Stanolind will follow suit when the sweet oil areas are connected.

Garvin County, Oklahoma, Field Receives Outlet

Construction of a six-inch pipe line from the Fen-Ter Refining Company plant at Wynnewood, Okla., to the new North Davis field in Garvin County, Okla., has been announced by Kerr-McGee Oil Industries, Inc., and Fen-Ter. The oil line will be paralleled by a gas line, on which will be installed heaters to permit free flow of the 13-gravity crude oil.

The new field was discovered by Continental Oil Company's Butterly 1, NW SW SE 14-1n-1e, and tested 240 barrels of oil in 24 hours. Production is from the Oil Creek sand at 3963 to 4018 feet.

Socony-Vacuum Lets Contract For 32-Mile Line in Kansas

The White Eagle division of Socony-Vacuum Oil Company has awarded a contract to Rumsey Brothers, Wichita, Kan., to lay 32 miles of eight-inch pipe line from the Morrel pool, Graham County, Kan., to the Bemis station of Kaw Pipe Line Company. The pipe to be used will be surplus casing acquired from the U. S. Surplus Property Office and the steel was originally intended for use in the making of shells.

Rehearing Granted

Northern Natural Gas Company, Boone, Ia., has been granted application by the Federal Power Commission for a rehearing to furnish service to an industrial customer at Boone. The Commission had denied the company's initial request on the ground that coal was available to the Boone plant.

PIPE LINES

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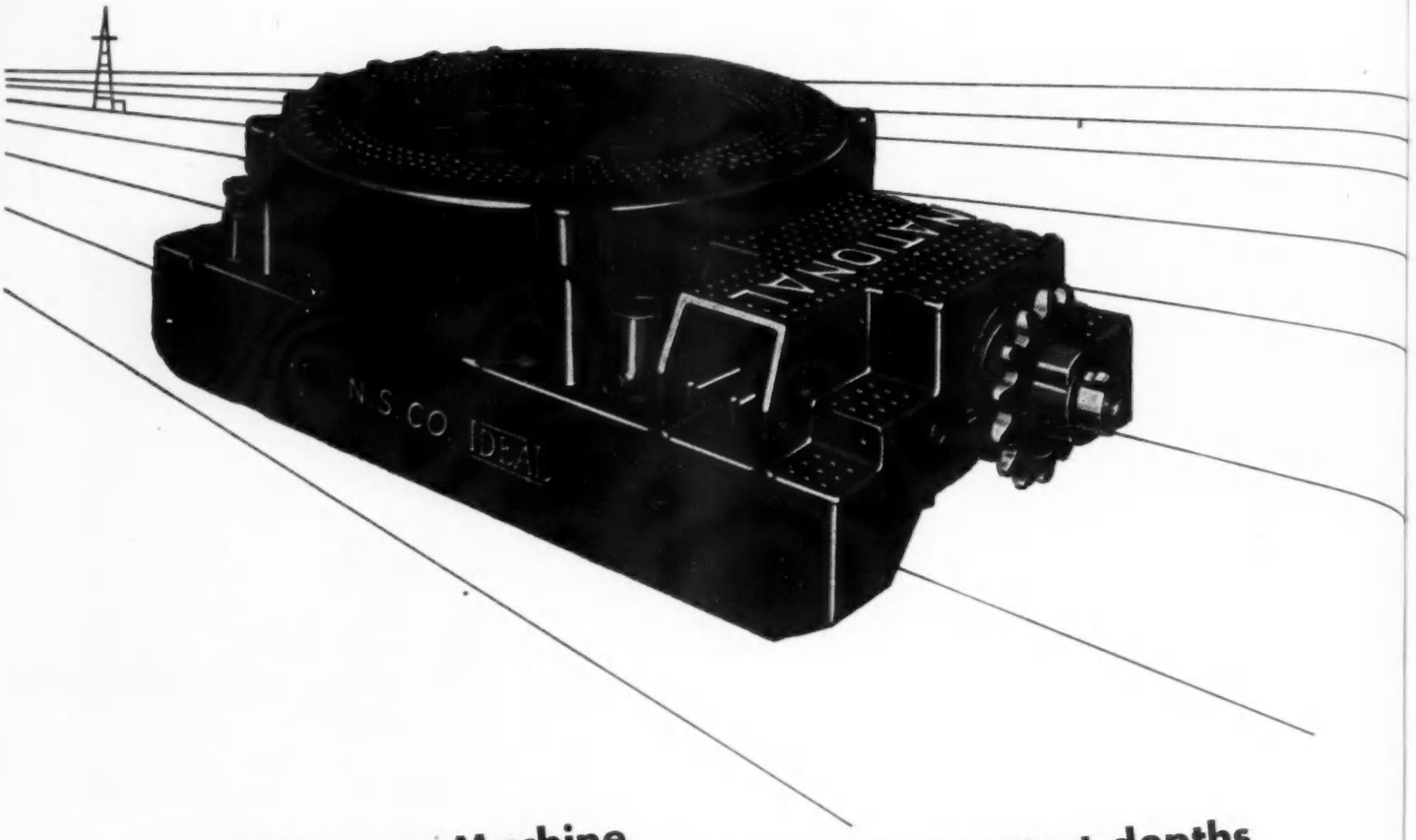

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☆ Oklahoma

Logan Discovery Testing; West Edmond Has Extension

Logan County discovery continues testing; third producer seen for West Billings; West Edmond pool gets south extension; Plymouth starts outpost in North Lindsay area; Continental tests outpost north of Old Brown pool; heavy oil found between Woolsey and Comanche pools.

Logan County: Sinclair Prairie Oil Company et al's Teuscher 1, SE SE SW 34-15n-1w, important pool discovery on a unitized block partly in Logan and partly in Oklahoma counties, continued testing with results emphasizing the importance of the strike. After shutting in for a week while storage facilities were being erected, operators reopened the well and in 17 hours it flowed 435 barrels of oil through 1-inch choke. Production is from Second Wilcox sand between 5920-41 feet, total depth. First Wilcox sand was dry and saturation is reported in the bottom 4 feet of hole. On initial test the well kicked off at the rate of 600 barrels per day, natural.

Noble County: In an attempt to increase production, Phillips Petroleum Company is moving in cable tools to deepen Chapin 1, NE SE SE 11-23n-1e, southwest offset to the Red Rock pool discovery which was recently reported. The Chapin well was drilled to 4633 feet and tested approximately 55 barrels of oil per day plus a small amount of water through ½-inch choke with the Wilcox sand topped at 4612 feet.

Meanwhile, a third First Wilcox sand producer loomed for the new West Billings pool following a successful drillstem test at Deep Rock Oil Corporation et al's White 2, NE NE NE 19-23n-2w. The well is a northeast offset. Test was made at 4436 feet with packer set at 4421 feet and showed for 30 barrels of oil an hour plus 1½ million cubic feet of gas. Producing sand was topped at 4422 feet. With the west side of the pool fairly well defined by dry holes, interest at present centers to the north.

Garfield County: Continental Oil Company continues testing at Brown 1, CN½ NW SW 10-20n-4w, outpost north of the Old Brown pool. Layton sand was topped at 4453 feet and drilled to 4514 feet, total depth. Latest reports indicate the well is swabbing about 140 barrels of oil plus a small quantity of water per day. Crews continue to clean out and swab.

Stephens County: An interesting black oil strike is reported between the Comanche and Woolsey pools at William H. Atkinson et al's Peck Heirs 1, SE SW SW 32-2s-6w. The wildcat set pipe at 2440 feet on top of the Arbuckle, which had stains and odor. Plug was drilled to 2448 feet and the hole was acidized and deepened to 2483 feet, where it was reacidized and swabbed in for an estimated 100 to 200 barrels of 20-gravity black oil per day. The test is on an 800-acre block with Fox & Fox of Oklahoma City owning ½ interest in the play.

West Edmond: Phillips Petroleum Company has extended the West Edmond pool ¼ mile south to within ¾ mile of the Bethany townsite at Dole 1, CNE NW 9-12n-4w, Oklahoma County sector of the 4-county pool. After treatment with 1000 gallons of acid the Dole flowed 389 barrels of oil in 18 hours through choke from the Bois A'Arc section of the Hunton lime. Gas-oil ratio was 812/1, with pipe set on bottom at 7257 feet.

McClain County: Plymouth Oil Company, a newcomer to Oklahoma, staked Gibson 1, SW SE SW 14-5n-4w, approximately a mile northeast of Cities Service Oil Company's North Lindsay pool discovery, deepest producer in Oklahoma. The test will be watched with the greatest interest since the pool has the earmarks of becoming one of the state's most important new reserves. The well is also about ½ mile northeast of Frank Russell's Sandburr 1, NE NW NE 22-5n-4w.

Garvin County: Vickers Petroleum Company et al's Gibson 1, CSE NE 30-3n-2w, pool opener southwest of Antioch, continued to test basal Pennsylvanian sands and was reported flowing 18 barrels of oil an hour with a trace of fluid and drilling mud. Pipe was perforated at 6533-39 feet and since production test started several days ago the flow has continued to increase with the cutting decreasing. Tests are through 1-inch choke on tubing.

☆ Kansas

Sohio's Ness County Test Is Prospective Pool Opener

Ness County has prospective pool opener; 2 wildcats in Rooks County testing; Shell abandonment in Pratt County being reactivated by Bridgeport Oil; operators continue to watch Seward County test.

Ness County: Sohio Petroleum Company's Order of the Holy Cross 1, C SW SW of 23-16s-25w, east of the Arnold pool, appears to be opening a new field in Ness County. At 4549 feet in the Mississippian, the wildcat swabbed ½ barrel of oil an hour natural and after treatment with 1000 gallons of acid, swabbed 3½ barrels per hour. Additional acid is being applied. The Mississippian was topped at 4531 feet.

Rooks County: Two miles southwest of the Westhusin pool in Rooks County, The Atlantic Refining Company's Car-

Wells Completed in United States in Week Ended February 23, 1946

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS						WILDCAT COMPLETIONS				ALL COMPLETIONS			
	New Wells					Old Wells							Cumulative	
	*Oil	Gas	†Input	Dry	Total	Deepened	*Oil	Gas	Dry	Total	This Week	Last Week	This Year	Last Year
Alabama													3	3
Arkansas	1			1	2		1		2	3	5	2	26	20
California	42			2	44				4	4	48		274	300
Colorado													14	7
Florida													4	1
Georgia														1
Illinois	15			6	21	2			6	6	29	32	260	266
Indiana	4			1	5				1	1	6	7	42	41
Iowa														1
Kansas	17	4		7	28	2			5	5	35	40	334	191
Kentucky	10				10				2	2	12	10	82	87
Louisiana	17	1		8	26		2		1	3	29	21	183	145
North Louisiana	7	1		6	14				1	1	15	9	98	52
South Louisiana	10			2	12		2			2	14	12	85	93
Michigan	4			4	8				8	8	16	15	111	109
Mississippi	2				2				2	2	4	3	27	52
Missouri													1	8
Montana													37	27
New Mexico	4				4				1	1	5	6	61	77
New York	15	1	10		26						26	25	178	109
Ohio	3	2		2	7						7		94	106
Oklahoma	22	3	1	11	37				4	4	41	42	383	338
Pennsylvania	28	1	15	4	48						48	42	365	370
Tennessee													1	
Texas	94	11	1	17	123	4	4	1	23	28	155	159	1,193	1,017
E. Tex. Bor. Co.'s												3	26	7
E. Texas Field													1	
Rest of E. Texas	4	1		1	6	1			1	1	8	13	71	31
North Texas	27	1	1	10	39	2	1		5	6	47	37	327	249
W. Central Tex.	4			3	7				3	3	10	9	99	49
West Texas	34				34				4	4	38	37	249	272
Tex. Panhandle	3	6			9	1					10	10	76	87
G. Coast, Upper	6	2		1	9		2		2	4	13	16	116	95
G. Coast, Lower	13	1		1	15				5	5	20	25	166	148
Southwest Texa	2			1	3		1	1	2	4	7	8	49	71
S. Central Texas	1				1				1	1	2	1	13	8
West Virginia		9		3	12						12		67	107
Wyoming	1				1						1		21	23
Total U. S.	279	32	27	66	404	8	7	1	59	67	479	404	3,761	3,496

* Includes distillate wells. † Includes salt water disposal wells.

michael 1, a wildcat in C SE NE 16-9s-17w, is testing. Following acid treatment at 3429-35 feet, the well swabbed 2½ barrels of oil and 2 of water an hour. The white Lansing lime was topped at 3227 feet, and the Arbuckle at 3539 feet. Total depth is 3547 feet.

Republic Natural Gas Company's Cooper 1, SE SE SE 14-7s-20w, has set casing atop the Arbuckle at 3498 feet with total depth 3511 feet. The test is approximately 4 miles northwest of the town of Webster and 8 miles south of the South Ray pool, nearest production.

Pratt County: Two miles north of Sawyer in southeast Pratt County and 5 miles southwest of the prolific Chitwood pool, Bridgeport Oil Company's Stoops 1, SEC SW 7-29s-12w, was cleaning out an old hole originally drilled by Shell Oil Company. This well, now being cleaned out below 3000 feet, was abandoned by the original driller without testing a show in the Viola, topped at 4446 feet. A 25-foot section showing oil was noted when the well was drilled.

Seward County: Stanolind Oil & Gas Company's Adams Gas Unit, CN½ S½ NW 14-35s-31w, wildcat in Seward County and 3 miles southwest of Stanolind's Adams Ranch gas discovery in Meade County, is still holding the interest of Kansas operators. After finding the upper gas sands non-productive, the well continued to make hole, topping the Mississippian at 6196 feet. A drill-stem test at 6147-87 feet recovered gas-cut mud.

☆ West Texas

Ellenburger Failure Listed For North Goldsmith Field

Ellenburger failure listed in North Goldsmith field; Block 31 field has second producer, and gains in operations; Jones Ranch field outpost is structurally low.

Ector County: Stanolind Oil & Gas Company's Williamson 1, ⅝ mile northwest of the North Goldsmith field, recovered sulphur water when tester was used at 10,182-290 feet in Ellenburger, topped at 10,198 feet with elevation 3302 feet. Pipe is due to be set for additional testing of promising shows logged in the Devonian and Silurian, topped at 8045 and 8555 feet, respectively. The company paid $468,437.50 cash along with a substantial oil payment for lease on 3416 acres in support of this deep project.

Stanolind's Scharbauer 3-Q, north edge of the Goldsmith field and a failure in the Ellenburger, swabbed and flowed 33 barrels of oil on 7-hour test through open tubing after additional perforations in Clear Fork at 6090-6185 feet. The company's Kayser-Unit 1, 1¼ miles southwest of the Foster field, was drilling lime-shale at 10,250 feet, with base of Permian called at 8380 feet.

The Texas Company's Connell 29, 1½ miles west of the Penwell field, failed to produce from deeper zones in drilling to water in Ellenburger at 9675 feet, and has been plugged back to 3612 feet to try for production in the field's regular pay. This prospect showed sufficient oil in the Holt to warrant a nearby test. Phillips Petroleum Company's Eidson Unit 1, ¾ mile west of the north end of the field, was drilling lime at 7120 feet. The latter indicated production in the Holt. Cities Service Oil Company's Parker-Wentz 1, ¾ mile southwest of the Harper field, was drilling lime and shale at 10,190 feet without shows.

Crane County: The Atlantic Refining Company's University 1-L-31, C NE SE Sect. 28 and a mile north of its dually-completed discovery for the Block 31 field, flowed 49 barrels of oil hourly on 5-hour natural test through ⅜-inch bottom-hole choke. This production is from perforations at 8820-8950 feet in Devonian, topped at 8160 feet, or 258 feet low. Additional perforations will be made lower in the section. The company's University 1-D-31, ⅔ mile northwest of the discovery and the lowest of 11 tests that have drilled to the Devonian, was drilling at 8470 feet in Devonian, topped at 8230 feet. Two drill-stem tests yielded adequate oil and gas showings to indicate probable production from the upper section. Two new tests authorized recently by Atlantic as northwest and northeast outposts complete the allocation of rigs to its 19 160-acre leases that will expore November 14 unless productive, although 2 of the total are now validated. The outlook is favorable for all tracts to be productive in the Devonian, but some tests are outside the Ellenburger producing contour.

Sid Richardson's Dawson 1, Sect. 2, A. L. Brigance Survey, was drilling Simpson at 7220 feet, having tested dry at 7136-90 feet in the McKee sand, topped at 7124 feet. This marker correlates 1100 feet low to Gulf's Cordova 1-E, recent failure in Ellenburger at 6740-6929 feet and 2⅝ miles to the southeast. Gulf's Starnes 1-E, a failure on the north end of the 3-well explorations, quit in the Upper Ordovician at 7933 feet, having entered the Devonian at 6840 feet, Silurian at 7770 feet, and Montoya at 7885 feet.

Andrews County: Shell and Texas Company's Ratliff-Bedford 2, southeast offset to their Bedford field dually-completed discovery, was drilling dry Devonian at 9050 feet, having tested only 275 feet of oil- and gas-cut mud at 8929-9045 feet. The discovery logged its most effective Devonian pay above and below this level.

Winkler County: Texas Pacific Coal & Oil Company's Brown-Altman 1, Account 4, indicated Holt (Glorietta) lime oil discovery between the Weiner and Emper Deep areas, was running pipe to plug back and test after reaching sulphur water in the Clear Fork, which was drilled to 6255 feet. Flowing production is anticipated from the maximum zone of porosity and saturation at 4776-98 feet, while broken porosity below will be tested first.

Sun Oil Company's Wheeler 2, southwest edge of the Wheeler 3-pay field and ¼ mile south of the first Devonian completion, was running pipe after entering the Ellenburger at 10,592 feet, or 40 feet low. This outpost correlates 70 and 93 feet low, respectively, on the Devonian and Silurian markers, with production confirmed by drill-stem test from the Devonian.

R. R. Herrell et al's Burton-Lingo-Humble 1, 5 miles west of the Hendrick field and first deep test for the area, entered dry Delaware lime at 5084 feet, with elevation of 2863 feet, and was idle for rig repairs at 5144 feet.

Gaines County: Amerada Petroleum Corporation's Jones 1-B, ¼ mile west of its Jones Ranch pool record-depth discovery, was drilling at 9857 feet, and Jones 1-C, ¾ mile southeast of the producer, was drilling lime and chert at 10,614 feet. The latter entered the Pennsylvanian at 9315 feet. Argo Oil Corporation's Jones 1-E, a mile east of the discovery, entered the Pennsylvanian at 9420 feet, or 102 feet low to the deepest drilling test, and shut down at 9800 feet to await its outcome. These 3 tests showed water in the 9000-foot Wolfcamp, which recorded a favorable showing in the discovery. Drilling & Exploration Company, Inc.'s Davis 1-D, Yoakum County and 6⅜ miles north by east of the Jones Ranch pool discovery, was drilling dry lime at 8660 feet on Devonian objective. The Abo green shale was topped at 7990 feet, or 92 feet low to Jones 1-B.

☆ Central West Texas

Shackelford's Ellenburger Prospects Disappointing

Shackelford County's Ellenburger prospects prove disappointing; Palo Pinto County Ellenburger strike to make pumper, Jones County has small discovery.

Shackelford County: Phillips Petroleum Company's Hickman-Pan 1, NE SW NE Sec. 16, tested oil and water after drilling plugs from pipe at 4210 feet with the well bottomed at 4220 feet in Ellenburger, topped at 4200 feet with elevation 1355 feet. It is structurally low for the area. Allied Oil Company's Sanders 1, East corner of TE&L Company 583 and 4 miles northeast of Albany, swabbed dry from Ellenburger section at 4508-39 feet and will be acidized. This wildcat filled 1500 feet with oil in 2 hours prior to setting pipe. Texas Pacific Coal and Oil Company's Snyder Q-A, sec. 36, entered the Bend at 3441 feet with elevation 1406 feet, and was drilling at 3680 feet with the Marble Falls as its next objective. C. H. Osmond et al's Green 1, Sect. 29 and semi-wildcat for the Ibex field, failed to respond to initial treatment of 500 gallons of acid at 4375-79 feet in Ellenburger, topped at 4360 feet with elevation of 1318 feet. It will be reacidized.

Jones County: Oscar Donley et al's Higgs 1, SEC T&P Ry 3, Block 15 and 1¼ miles southeast of production, is rated as a 15-barrel pumper after acidizing the Flippen, with the hole bottomed at 2500 feet.

Palo Pinto County: Ashland Oil and Refining Company's Lee 1, SWC TE&L CO 1744 and 1¼ miles southeast of shallow production, was showing for a 50-barrel pumper after acidizing Ellenburger at 5040-46 feet.

New Mexico Surplus

Curtailment of refinery operations in the Artesia-Roswell area due to discontinuance of government purchases has resulted in a surplus of 1500 barrels daily of crude production in the Eddy County sector of New Mexico. No immediate relief is in sight, since the only trunk line outlet is operating at capacity in serving its regular connections in the Permian Basin.

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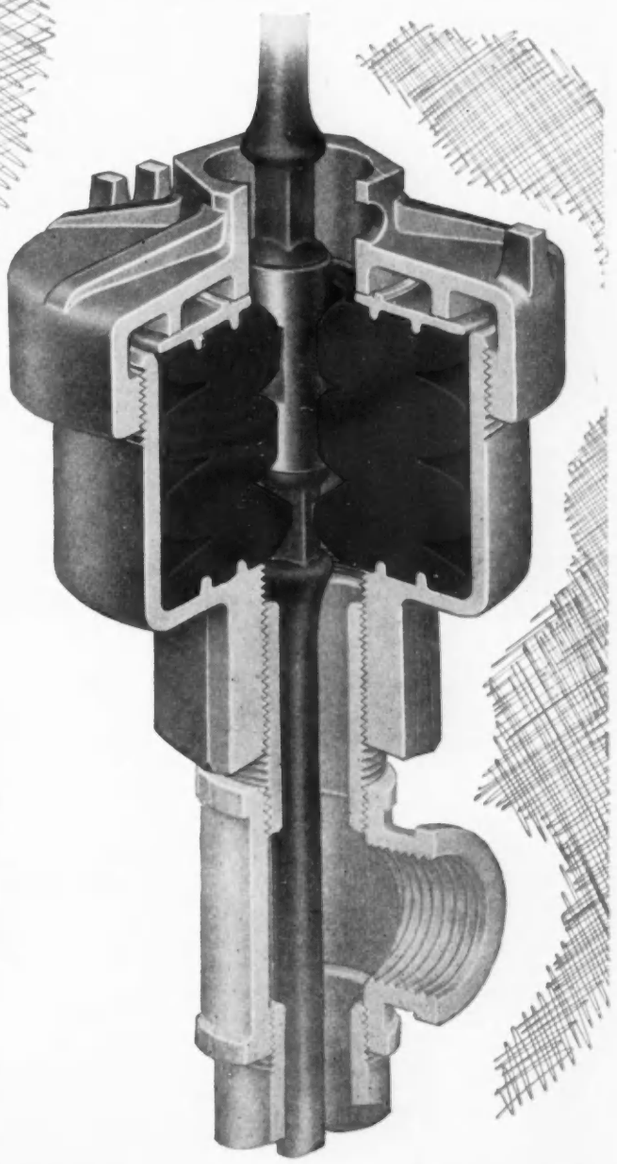

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☆ North Texas

Wilbarger Test Has Choice Of Zones in Completion Try

Wilbarger County wildcat has choice of 2 zones of oil saturation in making completion try; Sivels Bend field deep test improves outlook for Ellenburger production; Ellenburger reached by Grayson County prospect.

Wilbarger County: W. T. Waggoner Estate's Fee 1-QQ, C E½ SE SE H&TC Ry. 39, Block 2, and 2⅓ miles southwest of the Rock Crossing multi-pay field, was moving in perforating equipment to test oil shows in the Bend and Ellenburger, topped at 4084 feet and 4442 feet, respectively. Pipe was cemented at 4651 feet, or 1 foot off bottom. Favorable drill-stem tests were made of Bend saturation at 4084-4125 feet and at 4155-61 feet, while probable pay was logged in Ellenburger at 4513-22 and 4581-89 feet. This wildcat is a mile plus north by west of Wilcox Oil & Gas Company's Waggoner 1, a 5056-foot failure. The new test shows a thinning of 218 feet in the section between the top of the Bend and the Ellenburger.

Young County: Hanlon & Buchanan, Inc.'s Kendall 1, J. C. Crosby Survey and 1½ miles south by west of nearest production in southwest sector of county, flowed 316 barrels of 42-gravity oil, with gas-oil ratio of 1800/1, natural through ¼-inch for completion from Bend lime at 3466-81 feet. Outlying failures are adequately removed to permit a substantial producing area.

Cooke County: Standard Oil Company of Texas' Beasley 2, prospective Ellenburger discovery for the Sivels Bend field, was swabbing 39-gravity oil on preliminary test of perforations at 8905-40 feet. This is opposite the most effective zone of porosity logged in drilling Ellenburger section from 8640 feet to formation water at 9164 feet.

Grayson County: Denver Producing & Refining Company's Jewell 1, Denver pool deepened discovery, entered the Ellenburger at 8818 feet, and failed to register porosity or saturation in drilling to 8915 feet. This marker correlates about 687 feet high to The Pure Oil Company's Little 1-A, a 9919-foot failure 5 miles nothwest. Jewell 1 will be deepened to water. It attracted considerable interest some weeks ago in logging oil-saturated sand in the Oil Creek series at 8468-8545 feet, but drill-stem test was not made because it was in a sidetracked hole.

Archer County: Homer W. Snowden et al's Morrison 1, near center of TE&L Co. 1823 and a mile northeast of the Burns-Benson 2-pay pool, cemented 5½-inch casing at 4650 feet after recovering 200 feet of oil-cut mud when tester was used at 5220-36 feet in Mississippi, topped at 5220 feet. Saturation in the Bend, topped at 4495 feet, logged at 4495-4575 and 4606-30 feet, affords the best production prospects.

Wyoming Map Issued

A new map showing the areal and structural geology of the Garland and Byron anticlines and vicinity, Big Horn and Park counties, Wyoming, has been issued by the Geological Survey. The areal geology on the map is the same as that on a map of the Garland anticline by C. E. Dobbin, J. C. Miller, and K. L. Walter, of the survey staff, published in 1935. The structure contours and status of drilling development as shown are the result of investigations by Don G. Vieaux, geologist of the survey.

Copies of the map may be purchased at 10 cents each from the director of the geological survey, Washington 25, D. C., and at survey field offices in the Federal Building, Casper, and 314 Boston Building, Denver.

☆ East Texas

Smackover Prospect in Bowie Has Gas on Preliminary Test

Smackover prospect in Bowie County shows gas on preliminary test; pipe set for production test of Woodbine wildcat in Cherokee County, and deep operation in Rusk County.

Bowie County: Barnsdall Oil Company, Sohio and Phillips Petroleum Company's Pickering 1, R. E. Sevey Survey and 4 miles southwest of Texarkana, was running pipe to try for completion after recovering 420 feet of gas-cut mud on a brief drill-stem test at 7040-94 feet. The Smackover was entered at 7032 feet, with elevation of 299 feet, thus registering a high structural position for the area. The well is believed to be bottomed in igneous rock, which causes a short section of Smackover in the nearby Eylau 1-well pool, the latter is the only Smackover producing area in Texas.

Cherokee County: Tex Harvey Oil Company's Reitsch 1, O. Weir Survey and 10 miles northeast of Rusk, set pipe at 4416 feet, or 7 feet off bottom, after testing a show of gas without water at 4318-47 feet in Woodbine, topped at 4330 feet. In drilling through the promising pay section the first water sand was entered at 4359 feet, according to electrical formation survey.

Rusk County: Delta Drilling Company et al's Rayford 1, James Smith Survey and 2 miles south of Henderson, set pipe on bottom at 7515 feet in Travis Peak, topped at 7303 feet. This wildcat logged nominal porosity and saturation in the Rodessa and Travis Peak.

Wildcat Starts: Delta Drilling Company will seek production to the Travis Peak in drilling S. A. Martin 1, situated on a 40-acre lease in A. T. Flowers Survey A-264, southern Van Zandt County and 10 miles northwest of the Opelika multi-pay field. In northwestern Rains County, M. N. Massad of Tyler and associates will drill in the northwest corner of the J. D. Whittle 81-acre tract, Levi Welch Survey, a mile northwest of Point.

Wood County: Delta Drilling Company et al's White 1, J. Stark Survey A-537 and 1¼ miles northwest of a capped low-gravity Woodbine discovery, recorded favorable structural position in entering the Pecan chalk at 2830 feet, with elevation of 445 feet, and was drilling shale at 3897 feet.

Twin drilling has been started in the Quitman field, prolofic high-gravity Paluxy sand area, with a single Sub-Clarksville sand pumper. Rogers Lacy and R. J. Caraway's Cox 1-B-A, 193 feet southwest of their Paluxy well on the 40-acre lease, Jas. Barfield Survey, was drilling at 1710 feet to try for production in the 4100-foot Sub-Clarksville that was passed up by the earlier test.

☆ East Texas Border

Mile Southwest Extension Registered in Whelan Field

Mile southwest extension dual wet gas producer registered in Whelan field, Harleton area, Harrison County; deep wildcat in Huxley area, Shelby County, watched.

Shelby County: Humble Oil & Refining Company's Pickering Lumber Company 1, St. Francois Survey, Huxley area, which went to 12,221 feet and then plugged back to 9400 feet, saw further preparations for drill-stem testing. It is a closely watched wildcat whose latest test was made at 8196-8212 feet in the lower part of Travis Peak, in which recovery was only 60 feet of slightly gas-cut mud. Previous tests at 8315-9400 feet recovered 4500 feet of mud with salt water and slight gas cut.

Marion County: Magnolia Petroleum Company's Orr 1, Fowler Survey, 3 miles southwest of Avinger, was drilling sand with shale streaks at 9370 feet, and is reported still in Travis Peak where a drill-stem test indicated oil discovery at 7577-86 feet. The well is to go to 10,000 feet before attempting completion.

Harrison County: R. W. Williams' Furrh Estate 1, Frances O'Neal Survey, 3 miles northwest of Elysian Fields, expected to be completed as a small oiler, estimated production to be about 50 barrels per day. Testing resumed, with separator reported set and tanks erected, and well opened to permit separator to fill. Results of this operation warrant further testing of the area on the possibility that an edge-of-the-field discovery has been found. Production is reported obtained through 56 perforations of the casing at 6294-6308 feet in Travis Peak.

Final completion of a 1-mile southwest extension and dual wet gas producer in the Whelan field, Harleton area, was reported at Placid Oil Company's Knox 1, Parker Survey. Completion was from the regular Rodessa zone at 6790-6828 feet, and from Travis Peak at 7418-8084 feet. No gauge was announced.

Panola County: Interest centering in Carthage field was reported with active leasing play on the east side of the great gas-distillate field, in the Deadwood area. This is a direct result of findings in the Skelly Oil Company's Lewis Werner Sawmill 1-A, W. G. Anderson Survey, which logged porosity in the Upper Pettit from 5853-90 feet, though there was no porosity in the Lower Pettit. The well went to 6239 feet in the Travis Peak with 7-inch casing cemented on bottom.

☆ South Central Texas

Milam County Is Given Good Producer in Shallow Sand

Good producer completed in shallow sand in Milam County; Quintana goes below 10,000 feet in Gonzales wildcat; Tanglewood wildcat in Lee County drills in shale and lime.

Milam County: D. A. McCrary et al's McCrary 2, located 425 feet from the northwest line of the David Galleher Survey and 825 feet northeast of McCreary 1, was completed for 117 barrels

of 36.2-gravity oil and a little gas daily through a ¼-inch choke. The pay sand was topped at 2194 feet with 5½-inch casing at 2181 feet. The 2½-inch tubing was run to 2186 feet.

R. L. Holcombe et al's J. L. Byrd 2, 1 mile northeast of Sharp and 9 miles west of Rickdale, and 468 feet northeast of the Byrd 1 dry hole which was abandoned recently at a total depth of 1133 feet after it failed to produce commercially from the Austin chalk, was reported making production tests in the chalk.

Gonzales County: Quintana Petroleum Company's Spahn 1, wildcat 4 miles northwest of Gonzales, is drilling below 10,500 feet after a show of oil in the Glen Rose formation.

Amerada Petroleum Company's Henderson et al 1, 5 miles southeast of Waelder, was coring at 8480 feet after running an electric log to 8383 feet. The Austin chalk was topped at 8308 feet.

Lee County: Humble Oil & Refining Company's George Vick et al 1, Tanglewood area wildcat, was drilling lime and shale at 7312 feet. A good gas test was made at 6060-75 feet.

Bexar County: Chenoweth & Harroun's Blum 1, Gas Ridge deep test, is drilling below 6868 feet.

H. Stahl's Verjeda 1 drilled to 863 feet and set 7-inch casing at 835 feet. The well was reported testing the Eckert sand where a show of oil was made at 845-50 feet.

Dimmitt County: Howard & Wheeler's Henrichson 1, 2 miles southeast of Valley Wells, was fishing for drill stem stuck on bottom at 5043 feet.

Edwards County: Dan Auld's Hal & C. V. Peterson 1, wildcat 6 miles northeast of Rock Springs, SW¼ SE¼ AB&M Survey 16, Block 2, was preparing to move in a special type diamond bit rig to deepen the present hole which is at 4500 feet. The test is scheduled for 5500 feet to the Ordovician zone. This is said to be an experiment on high speed drilling in the hill country.

☆ Southwest Texas

Humble Stakes Deep Wildcat Northwest of Kelsey Field

Deep wildcat staked near Kelsey field; shallow test staked near Mirando City; Webb County test continues to drill.

Jim Hogg County: Humble Oil & Refining Company has made location for Mrs. A. M. Kelsey Bass 23, 10,000-foot wildcat test northwest of the Kelsey field and in the southeast corner of the county. It will be 2834 feet west of the company's Bass 18 dry hole and about 3000 feet northwest of its Bass 17, nearest producer.

Killiam-McLean of Laredo have located R. Holbein 1, a 3500-foot wildcat test about 12 miles southeast of Mirando City in the Las Animas Grant. It is 1335 feet from the west line and 5126 feet from the south line of a 1280-acre lease in the grant, and 1335 feet from the west line of the Hogg-Ridge Subdivision of the R. Holbein Ranch.

Webb County: Sun Oil Company's Isaac Hirsch et al 2, wildcat 26 miles northeast of Laredo, is drilling below 5900 feet. It is projected to 7500 feet.

The Texas Company has staked a 1200-foot wildcat test 16 miles northwest of Freer. It will be the Griffin Watkins Estate 1, San Casimiro y de la Fuentes Survey A-1208. The lease consists of 189 acres.

Texas also staked Daniel Adami 1, second wildcat location in the county to be drilled to 1500 feet. It is on an 1810-acre lease covering H&GN Surveys 2 and 4 and BS&F Survey 4.

Duval County: Cox & Hamon have located a 3200-foot wildcat test 4 miles southeast of Bruni, Los Angeles de Ariba Grant.

Starr County: Baldridge & King were making preparations to commence drilling on the Yturria Land & Livestock Company et al 1-A, new wildcat test 6000 feet southeast of the Garcia field and southwest of the Yturria field.

☆ Lower Texas Coast

South Cabeza Creek Area Wildcat Has Gas on Test

South Cabeza Creek area wildcat tests gas; Continental gets oil show on Wilcox test in Goliad County; Tuleta area test shows salt water in the Wilcox; Live Oak County gets new wildcat.

Goliad County: Jay Simmon's Mary Poehler 1, wildcat 2 miles northeast of the South Cabeza Creek field and promising for a new field or an extension, showed gas on a production test through perforations in the second zone of the massive Wilcox, topped with oil satura-

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tion at 8279 feet. A drill-stem test at 8000-10 feet showed gas condensate. Operators are coring after setting 5½-inch casing at 8287 feet.

Continental Oil Company's S. H. Reed 2, 8300-foot test in the T. S. Nelson Survey, 1900 feet south of the Shaper 1, South Cabeza Creek field, was drilling at 4550 feet after a 20-minute drill-stem test in the Pettus at 4543-50 feet. Sixty feet of 45.2-gravity oil and 30 feet of oil-cut mud were recovered with 1300 pounds shutin pressure developed. The Pettus was topped at 4536 feet.

Bee County: Mills Bennett's Berger 1, 2 miles southwest of Tuleta, was squeezing after failing on a second production test in the lower Wilcox sand with perforations at 8745-50 feet in the top section of the sand. The test showed salt water. Previous tests from perforations at 8780-90 feet in the bottom of the sand also showed salt water. Operators plan to perforate in a small section of the upper Wilcox at 8600-06 feet, and if this fails to show oil, completion will be made in either the Slick or the Luling sand or the Carrizo zone for a gas-condensate producer.

Live Oak County: Bridwell Oil Company was preparing to begin operations on R. W. Duncan 1, 500-foot wildcat test about 6 miles southeast of the Mt. Lucas field and 5 miles northwest of Lagarto in Live Oak County School Land Survey A-272.

DeWitt County: Sterling Oil & Refining Corporation of Houston staked Ernest Steinmann 1, 11,000-foot wildcat test 6 miles southwest of Yoakum. It will be in the Wm. P. Tumlinson Survey A-458.

Fayette County: Amerada Petroleum Corporation plans to start operations on G. L. Brown, Jr. 1, 5000-foot test in the extreme western corner of the county. It is on a 568.6-acre lease in the Jacob Stiffler Survey, 6½ miles northwest of Flatonia.

Brooks County: Magnolia Petroleum Company's Strachn 2, on west flank of La Gloria field, was completed for 144 barrels of oil daily through a 7/64-inch choke from perforations near 6400 feet, developing a tubing pressure of 1325 pounds and a casing pressure of 1475 pounds. Gas-oil ratio was 720/1.

Recycling Plant Projected For Benton Field, Louisiana

Continued favorable developments in the Benton field, Bossier Parish, Louisiana, have resulted in unitization of the field and plans for building a $3 million recycling plant.

Barnsdall Oil Company, which with Sohio Petroleum Company, brought in the Benton field's discovery, recently completed the unitization and proposed the building of the recycling plant along with the drilling of 14 new wells during the year.

Landowners of the area named a committee to appear before the Louisiana Department of Conservation, scheduled to hold a hearing in Shreveport March 14 and 15.

A. M. Wallace, district attorney of Bossier Parish, was named temporary chairman, and Parish Clerk A. J. Broussard was named temporary secretary of the group, to serve until the next meeting.

☆Upper Texas Coast

Ohio to Unfreeze Strike Near Cleveland for Test

Ohio to unfreeze gas discovery near Cleveland for production test; Humble drilling after production test in Chambers County discovery well; Ariola flank test to become disposal well; Bon Weir test making oil and salt water; good producer completed in Old Ocean extension.

Liberty County: The Ohio Oil Company's Kirby Lumber Company 1, wildcat gas discovery several miles east of Cleveland in the James McCoy League, was rigging up heating equipment on flow lines to continue potential tests after the lines froze up when the well was almost clean. Gas production is from 63 perforations at 9106-27 feet through ⅛-inch choke, with tubing pressure 3150 pounds and casing pressure 3250 pounds. The hole was drilled to 10,285 feet with cores taken most of the way. When no better indications were encountered below the 9100-foot gas section, the well was plugged back and 7-inch pipe set at 9209 feet.

Ohio has staked B. E. Quinn 2-A, a miles northeast of the discovery well, with a projected depth of 10,300 feet.

Chambers County: Humble Oil & Refining Company's Lula Wallis et al 1, wildcat discovery for a new pay sand in the area more than a mile southeast of production in the Mayes field, was drilling at 10,010 feet in hard sand and shale after making production tests from open hole below 5½-inch pipe set at 9995 feet, with bottom at 10,000 feet. The well flowed 27 barrels of 53.4-gravity oil in 11½ hours through a ¼-inch choke with a gas-oil ratio of 12,900/1. Tubing pressure was 600 pounds.

Hardin Conuty: Houston Oil Company of Texas and American Republics' Ariola Fee 18, south flank test of the Ariola field, will be made into a salt water disposal well after extensive production tests in seven perforated zones showed only salt water production with no pressure developed. Seven-inch pipe was swung inside 9⅝-inch casing and lowest perforations were made at 7175-80 feet where salt water was recovered on drill-stem tests. Highest horizon tested was at 5435-40 feet where, on a 1-hour and 10-minute drill-stem test, only mud was recovered, with no pressure developed. Two cement plugs were placed in the hole, at 5280-5400 and 2700 feet. The 9⅝-inch casing will be cut at 900 feet.

Newton County: Humble's W. W. Moore, Jr., 1, Bon Wier area, A. L. Stark Survey A-384, was reported testing for production through perforations at 12,006-15 feet after washing the hole and resetting the packer. It was swabbing and flowing by heads, making salt water and oil at the rate of 60 barrels per day through ⅜-inch choke with a gas-oil ratio of 13,700/1.

A. E. Borger et al's C. C. Brown & Dewey Godgray 1, wildcat test east of Murksville in the James Terry Survey, Abstract 423, was reported making preparations for a production test. Salt water encountered near 8600 feet was shut off. The well has 2 or 3 sections in the Wilcox that may prove productive. Total depth is around 9400 feet with production pipe set at 9350 feet.

Brazoria County: Magnolia Petroleum Company & J. S. Abercrombie's H. B. Vesey 1, extension test in the southeast area of the Old Ocean field and 1896 feet southeast of the Peter Studer et al 1 which extended production in the area, has been completed for 295.88 barrels of 47.7-gravity oil daily through a ¼-inch choke from 96 perforations at 10,960-80 feet with tubing pressure 3550 pounds. The pay sand was topped at 10,820 feet with bottom at 11,010 feet, where 7-inch casing was cemented.

Contract Renewed

Standard Oil Company (New Jersey), Louisiana division, has renewed contract to sell its 1850 barrels daily of controlled production in the Charenton field, Louisiana, to Cities Service Oil Company during the remainder of 1946.

☆South Louisiana

West Tepetate Deep Test Has Difficulty in Completing

West Tepetate deep sand test encounters difficulty in atempting completion; Humble to plug Bayou Sorrell wildcat; Oberlin discovery well increases gas production.

Jefferson Davis Parish: Barnsdall Oil Company's M. M. Stafford Unit 1, deep sand test in West Tepetate field, 36-7s-3w, was unable to make a satisfactory completion in the field's deepest pay sand. Production tests through 24 perforations at 9894-9902 feet showed some 52-gravity distillate with tubing flow pressure 6300 pounds. On another test made at 9512-22 and 9522-28 feet, the well showed gas with a shut in pressure of 2900 pounds, but bled down to 100 pounds when flowing a small amount of high-gravity oil. The well has been plugged back and a completion try is being made from perforations at 9328-36 feet through various-sized chokes. Latest gauge was 50.6 barrels of 52-gravity condensate through a 9/64-inch choke under 4800 pounds tubing pressure and a gas-oil ratio of 28,656/1. This sand corresponds very closely to the pay sand of the Fuselier 3 which produces from 9272-76 feet.

Iberville Parish: Humble Oil & Refining Company's Baist Cooperage Company, Inc. 1, 92-12s-13e, wildcat in the Bayou Sorrell area which blew out and caught fire, is to be abandoned. The well blew while drilling at 10,960 feet and was bridged to choke out the fire. Operators are attempting to set a cement plug.

St. Landry Parish: Crosby Drilling Corporation & Lyle Cummin's Eugene Gordon 1, wildcat in the Woodside area of the extreme northeast corner of the parish, was drilling in shale at 11,025 feet. Sidewall cores from the Upper Wilcox at 10,202-04 and 10,653-55 feet and 10,893-95 feet made no shows.

Washington Parish: Humble's Gaylord Container Corporation 1-B, 42-1s-14e, Angie area wildcat just south of the Mississippi state line, was reported at 2923 feet. Operators are reaming out the hole after attempting to run 13 3/8-inch surface pipe which would not go

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down. The well is scheduled for 11,500 feet.

Allen Parish: Humble's Mrs. J. A. Bel Estate 1-B, 33-5s-4w, Oberlin area discovery well, was increasing gas flow with recent tests indicating a gas-oil ratio of 3221/1. Production was 131 barrels of 47.5-gravity oil daily from perforations at 10,658-62 feet through a 5/32-inch choke. Tubing was set at 12,658 feet.

Rapides Parish: Union Producing Company et al's Belgard 1, wildcat test in the Big Island area, NE NW 14-4n-3e, is drilling below 10,071 feet after setting 7-inch production pipe at 10,008 feet. Proposed depth is 12,000 feet and if no further shows are encountered, the hole will be plugged back for tests in the Massive section of the Tuscaloosa.

La Fourche Parish: Humble's Louisiana Delta Farms Company 1, 19-17s-23e, wildcat test in the Little Temple area, made some salt water on drill-stem tests conducted through perforations at 10,631-36 feet. Previous test from perforations at 10,609-15 feet showed salt water when the well had to be swabbed in after failing to flow. Total depth of well is 12,007 feet with 5½-inch casing set at 10,735 feet.

Beauregard Parish: Sun Oil Company's Rice Land & Lumber Company 1, 32-4s-11w, wildcat test in the Singer area was at 12,660 feet and has cemented 7-inch casing on bottom. The Wilcox was topped at 9156 feet and has been cored almost solid from that point to present depth.

Acadia Parish: Union Sulphur Company, Incorporated's Brunner-Bonnin 1, 60-8s-2e, deep test in the Branch field area, was drilling cement plug after setting 7-inch pipe at 10,913 feet. It is scheduled to test the Chickasway section.

Irwin-Hudson et al's Houssiere-Latreille 2-A, 29-9s-1w, Egan field, has been completed in the recently discovered new pay sand for 528 barrels of 37.5-gravity oil daily through a 12/64-inch choke from 50 perforations at 9920-25 feet with tubing pressure at 1765 pounds and a gas-oil ratio of 796/1. The new sand horizons came in from 9907 feet to 9927 feet.

☆ North Louisiana

Richland Parish Is Given Five Additional Producers

Five producers added in Richland Parish, wildcat in LaSalle Parish abandoned; discovery indicated in Mooringsport area, Caddo Parish; Benton field, Bossier Parish, gets mile northwest extension.

Bossier Parish: G. H. Vaughan's Herrick-Johnson 1, SW SW 36-31-13w, extended the Benton gas-distillate area approximately 1 mile northwest. Production was reported from "D" sand of the Cotton Valley, with good saturated gas-distillate cores recovered from 8013-29 feet.

Barnsdall Oil Company's wildcat, Crystal 1, SE SW 28-21n-11w is drilling below 7465 feet. Same Operator's Annie O. Hughes 1, NW SE 6-20n-12w, is drilling below 5560 feet; and same operator's Carter-Burton 1, C NW NW 26-23n-13w, is below 8450 feet in Cotton Valley.

Caddo Parish: Union Producing Company's, Noel Estate A-1, SW SW 11-19-16w, Mooringsport area, is in hard sandy lime below 9067 feet, having previously indicated discovery possibilities in Pettit lime. Phillips Petroleum Company's Waskom 1, SW SW 29-19-16w Longwood area swabbing some distillate from the Travis Peak below 5982-94 feet. It is a northeast offset of the company's Leake 1 producer

Claiborne Parish: Skelly Oil Company was preparing to test for production at L. A. Longino 1, SW NW 23-23-7w, southeast of production in the active East Haynesville field. Pipe was set at 5184 feet and cemented at 5170 feet. Preparations were being made to perforate. Skelly's Gandy-Valentine Unit 1, SE SE 29-206w, Athens field, where there was an oil discovery last year, set 8 5/8-inch pipe at 6772 feet.

Sabine Parish: Union Producing Company's Louisiana Long Leaf Lumber Company 1, SW SW 29-8-11w, scheduled for 10,500 feet with rig installed that will drill to 12,000 feet, was drilling in shale at 3228 feet.

L. & L. Oil Company's Pelican State Bank and Burr 1, 25-10-13w, was in shale and boulders at 1121 feet. Panhandle Refining Company's Meshell 1, scheduled 5000-foot wildcat, SW NE 22-7-14w, set 10-inch surface pipe at 626 feet.

La Salle Parish: McElreath and Suggest Company's Urania Lumber Company 3 in 3-10-3e, wildcat, was abandoned at 9280 feet.

Caldwell Parish: Shell Oil Company's Louisiana Central Oil and Gas Company 2, 36-15-2e, second well in the Vixen field, perforated at 9770-9800 feet, total depth 9963. Perforations will be squeezed.

Madison Parish: J. Lee Youngblood Company's U. S. Department of Agriculture 1, 34-15-14e, wildcat, set 10-inch pipe at 1328 feet.

Morehouse Parish: Sohio Petroleum Company's McDuffie 1, wildcat in 32-19-7e, drilled at 6494 feet.

Tensas Parish: Jay Simmons Company's wildcat Biedenhardt 1, 11-12-12w, drilled at 8455 feet.

Concordia Parish: S. W. Richardson Company's wildcat, Madison Oil & Development Company A-1, 34-6-9e, was drilling at 9823 feet.

Big Chief Drilling Company's Geo. B. Franklin 1, 7-17-9e, in wildcat territory, drilled below surface casing set at 406 feet.

Hunt Project to Eliminate Venting Is Near Completion

Louisiana Conservation Commissioner Joseph L. McHugh announced that by April 1 H. L. Hunt Oil Company and its affiliates in Louisiana will have completed a $1½ million project to eliminate venting of more than 10 million cubic feet of natural gas a day from about 100 oil wells in the LaSalle Parish area fields of Olla, Summerville, Little Creek and Nebo-Hemphill. Wells are being converted from gas-lift production to pumping, and gas produced in excess of actual fuel needs is reinjected into a producing reservoir for pressure maintenance. The company plans to minimize venting in the other fields in which it operates.

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☆ Arkansas

Haynesville Extension Well Has Oil Show on First Test

Haynesville extension well shows oil on first test; Arkansas County wildcat abandoned; Boone County well temporarily abandoned.

Skelly Oil Company's Myrtis Pipes Unit 1, SW C 26-19-20, Haynesville extension, which squeezed after 72 perforations between 5632-48 feet, and acidized with 3500 gallons, was flowing water and show of oil in first test.

McAlester Fuel Oil Company's D. E. Rogers A-1, SE SW 10-17-19, was near 4000 feet, and Ashland Oil and Refining Company's Bond Unit 2, C N½ S½ SE 10-17-19, was near 5900 feet. Both are in the Village field.

McAlester Fuel Oil Company's W. H. Russ, SW SW 12-16-20, wildcat 4 miles east of McNeil, south of the Stephens field, was digging pits.

Lafayette County: Barnsdall Oil Company's Col. Moore 1, Smackover lime test in the gas-distillate McKamie field, E C NW 37-17-24, was drilling near 4000 feet.

Arkansas County: C. E. Osborne's wildcat Stuttgart-Price L, C NE SW 16-2-8, was abandoned at 2540 feet.

Boone County: Wm. S. King's Bert S. Lee, Jr. 1, S NEC SW 24-18-22, was temporarily abandoned after reaching 607 feet.

Ouachita County: McAlester Fuel Oil Company's C. M. Wesson B-3, NW SE NW 24-15-19, in the Wesson field, Arkansas most active area, set 7-inch casing at 1900 feet. Good sand was reported at the 2600-foot level in the Glen Rose. Machinery will move to the south to same operator's B-4, SW SE NW 24-15-19.

Union County: The Atlantic Refining Company's wildcat discovery, Goode 1, NW 6-17s-13w, first Smackover lime producer in the Champagnolle field, is pumping 34 barrels of oil and 96 barrels, or 76 percent, salt water. Production is from open hole at 5632-45 feet, plugged back from total depth of 5657 feet.

Curtis Kinard abandoned Hammond 1, wildcat test in C NW NE NW 19-17s-15w, north of the El Dorado field, at 3702 feet without shows of oil or gas.

Miller County: G. Anthony et al abandoned W. A. Smith 2, SE 24-15s-26w, 3 miles northeast of Garland City production, at 4610 feet. According to electrical survey Paluxy was logged at 2640, Glen Rose at 3398, Massive Anhydrite at 3762, base of Massive at 3896, Gloyd at 4142, James at 4340, Pettit porosity at 4609.

Texas Fields Named

Don O. Chapell, chairman of the Oil Field Nomenclature Committee of the South Texas Geological Society, announced the official names of two new Texas oil fields. "North Minnie Bock" is the name given the field recently discovered by The Atlantic Refining Company's James H. Ewing 1, J. L. de Herrera Survey in Nueces County. The name "County Line Field" has been given the field discovered by Gorman Drilling Company's Roos Brothers 1, AB&M Survey, McMullen County.

☆ Mississippi

Big Show of Gas Reported In Warren County Prospect

Large show of gas reported in Warren County prospect; dual completion noted for Baxterville; Cranfield extension in Franklin County appears assured.

Warren County: Magnolia Petroleum Company's Ruth Pidgeon B-2, SWc SE SE 27-17n-4e, shallow test, is reported to have tested a large quantity of gas in a flank test of the King's Dome. About 8 million cubic feet of gas were reported to have been recovered from a drill-stem test at 1445-49 feet. Cores from the same horizon had recovered sand and shale with shows of heavy oil. The well is continuing to test to learn whether the gas is from a high pressure pocket or is in sufficient quantities for commercial production. Pidgeon 2 is an offset of the discovery well which blew out and burned several years ago. It is about 3 miles from the northern limits of Vicksburg. Frontier Oil Refining Corporation's F. C. Martin 1, wildcat in NW NW 1-16n-5e, has been abandoned in the Comanchean horizon at 8880 feet with no shows.

Lamar County: The Superior Oil Company's R. Batson 6, SWc NE NW 20-1n-16w, Baxterville field, has been completed for a good oil and gas producer. The well was dually completed with oil coming from perforations opposite the Marine Tuscaloosa at 8820-38 feet and producing at a rate of 138 bar-

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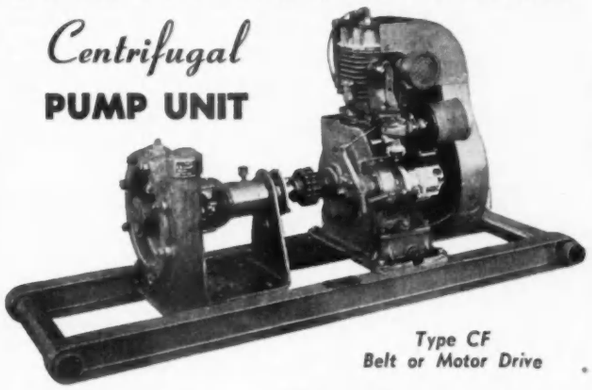

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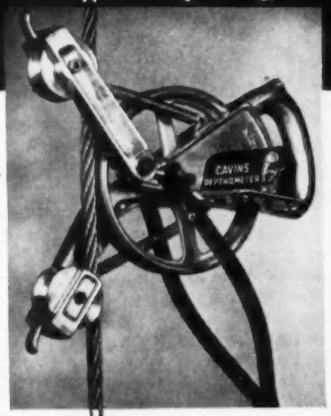

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rels of 15.8-gravity oil per day. Gas production is being made from the Eutaw zone at 7685-93 feet with initial test of 6,125,000 cubic feet of gas and 55 barrels of condensate per day. Gulf Refining Company's Mrs. L. T. Simpson 1, NEc SE 8-1n-16w, Baxterville has been successfully completed with well flowing oil and gas from the lower and upper Tuscaloosa zones respectively. In a drill-stem test at 8765 feet, well flowed 15.5-gravity oil at a rate of 288 barrels per day through ¼-inch choke.

Franklin County: The California Company's Homochitto Lumber Company 1, 27-7n-1e, east extension project for the Cranfield field, is swabbing oil and gas after a successful test of the Massive at 10,314-10,318 feet. The hole was acidized with 1500 gallons and after being shut down 6 hours, clean oil rose to 6600 feet. Gulf Refining Company's Ella G. Lees 3, SWc 32-7n-1e, is drilling below 9400 feet with no shows.

Copiah County: The Carter Oil Company's Reynolds C-133 1, NWc 12-10n-5e, wildcat, was testing at 9707 feet with no shows indicated. Cores taken slightly above that depth recovered sand and shale.

Adams County: Humble Oil & Refining Company's Mrs. C. L. S. McKittrick 1, SEc 12-6n-3w, Carthage Point field, continued to test after assurances of commercial production from the Massive sand. A drill-stem test at 10,278-83 feet yielded 808,000 cubic feet of gas and 67 barrels of 56.4 barrels of condensate through ¼-inch choke in 24 hours. Fluid ratio is 11,998 to 1. Both the Phillips Petroleum Company's Davey 1, 46-8n-2w, and Rosser & Pendleton-Sohio Petroleum Company's Baker-Maier 1, 34-6n-2w, wildcats indicating commercial production, are continuing to experience difficulty with salt water production. Tests are continuing in the effort to eliminate the trouble.

Wayne County: John C. Robbins, Jr.'s Bessie K. Finley 2, NWc SW 18-9n-8w, Eucutta field, has been completed with an initial production of 60 barrels of oil per day. Development of this field has been greatly decreased since the first of the year and expectations are that it will not see as many new wells drilled as in 1945. Humble's G.M.&O. Ry Co. C-2, NEc 13-9n-9w in Eucutta, has run casing to the productive Eutaw zone at 5225 feet and is making ready for production tests.

Jefferson County: Humble's S. Hirsch Co. 1, 15-9n-1e, Fayette field, flowed 33 barrels of 37.4-gravity oil in 14 hours from perforations opposite the Massive sand at 9656-67 feet opposite the Massive sand zone. Subsequently, the well was swabbed down to 3500 feet and mud and oil were recovered. Humble's J. Fred Gordon 1, NEc 25-9n-1w in Fayette, is drilling below 9500 feet with no shows reported.

Chickasaw County: A. W. Hutchings' W. C. Stone, Jr. 1, SE SW 29-12s-5e, shallow test which has shown encouragement during the past few weeks, has been abandoned after oil and gas shows failed to develop indications of commercial production. Casing was set to 2420 feet and in a drill-stem test slightly below that level, some traces of oil and gas in mud and water were recovered, but further tests failed to exploit the shows.

Florida

O. D. Robinson's wildcat, State Well 1, NW 29-59s-40e, Monroe County, on the Blanchard Concession in Florida Bay, extreme southeastern shoreline, had a showing of oil that may indicate the opening of Florida's second oil area. A core from 10,170-75 feet in Dolomite recovered 5 feet of lime with good stain, and a core from 10-175-78 feet recovered more lime with a slight show of oil. A core from 10,198-223 feet recovered dolomite and anhydrite with no showings reported. Crews are coring. Nearest production is in the Collier County Sunniland field, 96 miles northwest, where 2 producers have been completed.

Gulf Refining Company's deep wildcat, State of Florida 1, 68 miles southwest of the Robinson well in the Keys in 2-67s-29e, is drilling hard lime and dolomite below 3662 feet.

Collier County: Humble Oil & Refining Company's Gulf Coast Realty Co. 6, SW NE 19-48s-30e, Sunniland field is running core tests at the 9600-foot level. No shows have been reported.

Gilchrist County: Sun Oil Company's Alto Adams 1, N&E SWc 15-9s-15e, is drilling below 190 feet in a 5000-foot test.

Hernando County: The Ohio Oil Company's Hernasco Corporation 1, NWc 19-23s-18e, wildcat, is drilling below 2789 feet in lime with no shows reported so far.

Liberty County: The Pure Oil Company's Neal Lumber Company 1, wildcat, is drilling below 2468 feet in a shallow test.

Hillsborough County: Humble's T. S. Jameson 1, C NE NE 7-31s-22e, is drilling at 106 feet.

Alabama

J. H. Deason's DeBardelaben 1, SE NW 6-14s-5w, Walker County wildcat, is drilling below 1622 feet with on shows.

Winston County: Glen D. Rose Oil & Gas Company's First National Bank of Birmingham 3, SWc SE 7-12s-8w, is drilling surface hole for a test of the area. Rose was reported to have brought in a gas well with his Bozhell 1 in the same county last year, but after initial production test the well was reported to have been shut in.

Madison County: Newman Oil Company's Lam 1, C SW NW 10-4s-1e, is drilling below 910 feet.

Georgia

Kerr-McGee Oil Industries' Cecil Pate 1, Land Lot 144, Land District 13, Crisp County, was drilling at 4955 feet in red shale without shows. Tuscaloosa was topped at 2190 feet.

Montgomery County: James E. Weatheford's H. Wilkes 1, ½ mile west of Higgston, has reached a total depth of 120 feet after running 10-inch casing to that depth.

Opens Offices

I. Arnold Ross, former New York lawyer and certified public accountant who from October 1, 1943, to December 31, 1945, was one of three negotiators assigned by the RFC price adjustments board to the processing of cases of petroleum companies arising out of the renegotiation of 100-octane aviation gasoline contracts, has opened his own offices in New York and Washington to represent oil and other clients and tax, renegotiation and other matters before government agencies and the courts.

☆ Rocky Mountain Area

Greasewood Flats Field of Colorado Is Given Producer

Colorado's Greasewood Flats field has producer; Rangely field activity expanding; Iles Dome field records major completion.

Colorado

R. S. Shannon's wildcat in the Greasewood Flats area of Weld County, between Greeley and Fort Morgan, proved to be an oil well although a gauge had not been obtained. More than 3300 feet of oil were in the hole and tubing has been run to make a production test. The well was completed with cable tools after drilling to the pay sand with rotary. Two Ohio Oil Company-Tide Water Associated Oil Company wildcats drilled on an adjoining tract were abandoned within the past few weeks.

Rio Blanco County: Nine new locations were announced at Rangely field, four by The Texas Company, 4 by The California Company and one by Algord Oil Company. Water intrusion is beginning to be noticed in the edge wells drilled recently by Algord and Continental Oil Company. The Rangely Engineering Committee is beginning to function and is making tests of bottom hole pressure.

Moffat County: At Iles Dome, a well estimated good for 2000 barrels of oil per day through open hole was brought in by Stanolind Oil & Gas Company. This was the Iles Dome Unit 22, total depth 3315 feet, now flowing 576 barrels daily through 3/8-inch choke.

Michigan Scouts Elect

Dean C. Shackleford of Saginaw, chief scout for The Pure Oil Company, Michigan division, was elected president of the Michigan Oil Scouts Association, February 5. He succeeds Edgar Morgan of Shepherd, scout for Sun Oil Company.

Other officers elected include: Rex Grant of Lansing, Department of Conservation, vice president; William S. Sargent of Grand Rapids, The Ohio Oil Company, secretary; and Floyd Galloway of Mt. Pleasant, The Carter Oil Company, treasurer.

☆ California

Shell Has Strike Southeast Of Dominguez Oil Field

Shell has oil discovery ¾ mile southeast of Dominguez field; Richfield prepares to complete Bandini wildcat which flowed 800 to 1000 barrels on test; showings reported in well being whipstocked under ocean; Texas test wildcat drilled to develop gas in Yolo County; new gas producer extends Trico gas field northwest.

Los Angeles County: Shell Oil Company's Dominguez Estate 1, wildcat in 2-4s-13w, ¾ mile southeast of the Dominguez oil field, produced 207 barrels of clean 27-gravity oil on pump on a 14-hour test of sands between 8660-10,478 feet. Tests are continuing to determine the well's potentialities. Approximately 500 acres are involved in the play, with

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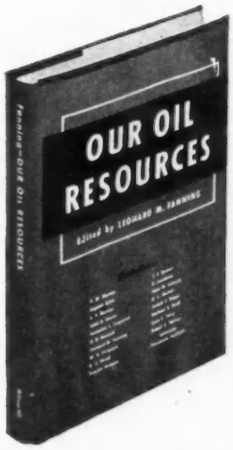

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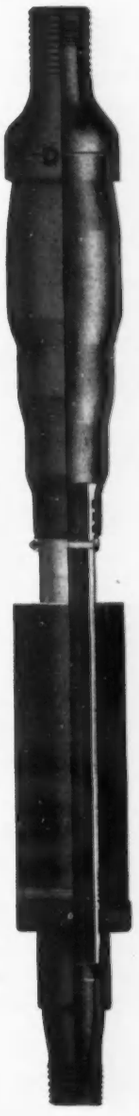

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COFFEYVILLE, KANSAS

Shell having ½ interest and Union Oil Company and Dominguez Oil Fields Company ¼ interest each.

In the Bandini area where Richfield Oil Corporation's Vail 1, 16-2s-12w flowed at the rate of 800-1000 barrels of clean 33-gravity oil on a test of sands at 7900-52 feet, operator set casing on top of a plug at 7900 feet and was preparing to complete the well. Richfield's Union Pacific Unit 1, 9-2s-12w, is currently producing 205 barrels net of 32-gravity oil and about 500 barrels of water. Oil production increased somewhat in the last week and water cut showed some decline. Well is producing through a 20/64-inch choke. In Sect. 21, Chanslor-Canfield Midway Oil Company's Bandini 1, down structure, is coring at 9275 feet. No oil showings have been reported.

Marine Exploration Company's State 1, which is being whipstocked out under the ocean from a site on shore at Seal Beach in 11-5s-12w, is coring below 8100 feet.

In the Huntington Beach area 3 operators were preparing to drill wildcat projects. Rothschild Oil Company located Newland 1, semi-wildcat east of the field in 12-6s-11w. A. E. Lyddon is preparing to drill a test, also east of the field. Location for Lamb Community 1 has been staked in 6-6s-10w. R. W. Jerman is grading location for Gothard 1 in 27-5s-11w.

In the Los Angeles City area the wildcat of Dumm Bros.-Olympic Refining Company, well 16 in 29-1s-12w, is being watched with some interest. First oil showings were logged at 4050 feet. Operator is drilling below 4400 feet.

Oil showings also have been reported in Standard Oil Company of California's Wigdal 1 in 19-3n-16w, Aliso Canyon area.

Yolo County: The Texas Company's test for gas in the Dunnigan Hills area, Hermle 1 in 21-11n-1w, was preparing to test gun perforations between 2570-80 and 2612-20 feet. Water shut-off has been obtained on 5½-inch casing cemented at 2660 feet.

Tulare County: G. B. Finch Oil Company has completed Finch 1 as a gas well, with no production estimate given. Well flowed 5,700,000 cubic feet in tests. It is in 7-24s-23e and extends the Trico gas field northwest. Production is from perforated intervals at 3179-3242 and 3285-95 feet. Operator has started Finch 2, also in Sect. 7.

Transcal Drilling Company's wildcat in the Kingsburg area, Harris 1 in 34-16s-23e, is being abandoned. No showings were obtained in drilling to 2610 feet.

Kern County: Amerada Petroleum Corporation's test for Schist production in the Ant Hill field has reached 4282 feet in Schist and operator was preparing to test.

Bandini Petroleum Corporation's Bacon Hills wildcat, Bacon 1 in 27-28-20 showed nothing encouraging during the week. Well was swabbed to 8250 feet with no oil in evidence and is now being perforated additionally for further tests. Total depth is 11,011 feet.

Amerada's try for production south of Bakersfield, Castro 45-12 in 12-30s-27e, is being abandoned. Electric log was run and a few sidewall samples taken, which uncovered nothing of interest.

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☆ Illinois Basin

Devonian Lime Strike Made At Edge of City of Mattoon

Devonian lime discovery registered near Mattoon, Illinois; Mt. Auburn pool, Christian County, extended; new area opened in Jasper County; mud, water hold up work at apparent discoveries in Henderson County, Kentucky.

An upswing in drilling in the Mattoon field was predicted on the basis of a Devonian lime discovery at National Consumer's Herkimer 3, SE NW NE 11-12n-7e, Coles County, at the north edge of the city of Mattoon. With casing set at 3170 feet, the well showed for 75 barrels of oil daily natural and was making approximately 250,000 cubic feet of gas. The discovery also will encourage deeper tests for the Trenton lime and St. Peter sand. Shows of oil were reported in the Devonian and St. Peter sand 5 years ago at a test drilled by The Carter Oil Company more than 4 miles south of the Herkimer 3.

Adding interest to the Mattoon area was the report that Vincent Nolan, head of the Erie Pipe Line Company, plans to start a test on an 1800-acre block 10 miles north of pool production but in an area long held favorable.

Christian County: John Wrather's Thompson 1, SE C 15-15n-2w, has extended the Mt. Auburn pool a mile north with Devonian lime production. The well pumped 10 barrels in 24 hours from pay at 1870-75 feet without acid.

Jasper County: The Pure Oil Com-

pany is opening a new area at Dodd 1, S½ SW NE 6-6n-11e, 3 miles east of Willow Hill pool production. Casing was set to test promising McClosky pay at 2645-50 feet.

Hamilton County: National Associated Petroleum Company's Neel 1, NW NE SE 32-5s-7e, 1½ miles northeast of the Dale-Hoodville pool, is a discovery in the Aux Vases sand. Pipe was set for test of saturation at 3100-3110 feet.

Kentucky

Mud and water which has slowed operation in the entire Illinois basin is holding up work at 2 apparent discoveries in Henderson County.

Basin Drilling Company, after a considerable wait, was preparing to drill plug at Washburn 1, 6-P-23, 2 miles west of the Henderson pool, for a test of Aux Vases sand at 2490 feet and McClosky lime at 2703 feet.

Otis Blankenburg is still waiting to move in standard tools at Vogel 1, 12-P-23, 1½ miles southeast of the Henderson pool for tests of McClosky break at 2470 and 2555 feet.

☆ Michigan

Allegan County Has New Pool Or Important Extension

W. Spencer Cook's Brenner 1, SE NW NE 15-3n-13w, Monterey Township, Allegan County, located a mile east of the old Monterey field, flowed 226 barrels the first day and 136 barrels the second from Traverse lime pay at 1615-84 feet to establish a new pool or important extension. Previously drilled dry holes apparently preclude complete tie-in with the old field.

Roscommon County: E. V. Hilliard's State D1, E½ SE SE 19-21n-3w, completed in the Squaw Bay (Upper Traverse) last year for a 44 barrel oil discovery at 3183 feet, was deepened to 3288 feet, drilling 10 to 18 feet of saturated limestone. It swabbed up to 30 barrels per day from the new zone, equivalent to the main pay in the old field, and appeared to be good for 50 barrels a day after a 500-gallon acid treatment.

☆ Canada

Imperial Oil Stakes Ninth Central Alberta Plains Test

Imperial Oil, Ltd., engaged in an exploration program to prove up a large natural gas reserve on the Central Alberta Plains (presumably with a synthetic gasoline plant in mind), has staked the ninth in its series of exploratory tests, and has added another 91,760 acres to its 250,000-acre block in the region being worked.

The new holdings, taken under reservation from the Alberta government, are east and south of the previously acquired acreage, in Twps. 45 to 49 Rge. 8w4, Twps. 45 and 46 Rge. 9w4, and Twp. 46 Rge. 10w4.

The new wildcat, Imperial-Kinsella 9, has been staked on the new reservation, in lsd 6 16-46-9w4. Most southerly well in the company's program to date, No. 9 is 7 miles south and 2 miles east of the Imperial-Kinsella 1 discovery, and 5 miles south and a mile west of the Imperial-Kinsella 6, now testing the Viking sand objective with commercial production indicated.

No. 9 and the previously announced Imperial-Kinsella 8 (north extension venture in lsd 11 22-49-11w4) will be drilled immediately with the 2 light rotaries engaged on the gas program.

Summary of results to date, spread over several townships, follows: Imperial-Kinsella 1, lsd 11 20-47-9w4, completed in Viking sand at 2151 feet, initial open flow potential 7805 mcf daily; Imperial-Kinsella 2, lsd 11 20-48-9w4, completed at 2135 feet, initial potential 19,500 mcf daily; Imperial-Kinsella 3, lsd 7 6-49-9w4, not yet drilled; Imperial-Kinsella 4, lsd 11 16-49-9w4, completed at 1993 feet, initial potential 1000 mcf daily; Imperial-Kinsella 5, lsd 7 11-48-9w4, completed at 1940 feet, initial potential 8148 mcf daily; Imperial-Kinsella 6, completed at 2037 feet in lsd 10 11-47-9w4, testing with a substantial gas well indicated; Imperial-Kinsella 7, lsd 7 22-49-10w4, completed at 2025 feet, abandoned, gas volume not commercial.

The crew at Oil Well Reflow Ltd.'s Westflank No. 2 well in South Turner Valley was still drilling out the bridge formed by the explosion of 5000 quarts of nitroglycerine in the Madison limestone formation February 4. Results of the blast—largest yet in any oil well—should be determined by the end of February.

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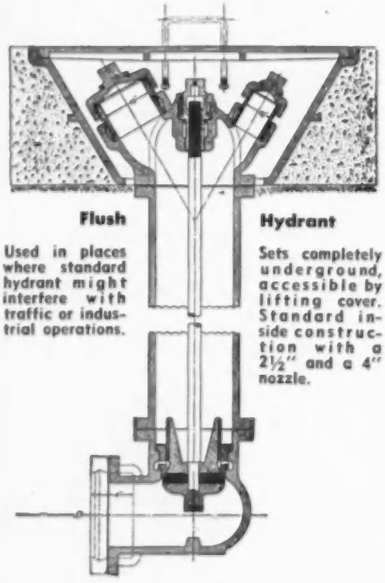

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EXPLORATORY COMPLETIONS

ARKANSAS WILDCATS

Boone County—Failure: Wm. S. King's B. S. Lee 1, sw 24-18s-22w, Batesville 600 ft, abnd 708.

Union County — Oil Discovery: Atlantic's Goode 1, nw 6-17s-13w, base Chalk 2492 ft, Travis Peak 2830 ft, Cotton Valley 3690 ft, Buckner 5550 ft, Smackover 5634 ft, porosity 5643 ft, pump 34 bbls oil, 96 bbls salt wtr, td 5645.

Union County — Failure: Curtis Kinard's Hammond 1, c nw ne nw 19-17s-15w, base Annona 2498 ft, Tokio 2995 ft, abnd 3702.

CALIFORNIA WILDCATS

Kern County—Failure: The Texas Co.'s Anderson 36-19, 19-29s-21e, Sheep Springs area, abnd 1702.

Montery County — Failure: C.C.M.O. Co.'s Solanco 1, 35-19s-7e, King City area, abnd 2627.

Orange County—Failure: McKee Oil Co.'s Kokx Community 8-1, 16-4s-9w, Olive area, abnd 4005.

Santa Barbara County — Failure: General Pet. Corp.'s Los Alamos 3, 31-8n-33w, Lompoc area, abnd 6287.

ILLINOIS WILDCATS

Clinton County—Failure: H. J. Schlafly et al's Schlafly Farms 1, sw sw ne 18-2n-1w, abnd 1630.

Coles County—Failure: Jarvis Bros. et al's Watson 1, nw ne sw 4-12n-9e, abnd 2239.

Effingham County—Failure: Frank Mitchell et al's Uthell 1, nw sw se 11-8n-6e, abnd 2554.

Marion County — Failure: S. H. Leavitt's McGill 1, sw sw nw 4-2n-4e, abnd 2814.

Randolph County—Failure: J. W. Osteen's Roth 1, nw nw blk 67 4-7s-7w, abnd 1756.

Wayne County—Failure: J. J. Lynn's Ellis 1, se se nw 34-1s-8e, abnd 3330.

INDIANA WILDCAT

Daviess County—Failure: Hoosier Gas Corp.'s Doyle 1, se se ne 15-2n-5w, abnd 700.

KANSAS WILDCATS

Barton County—Failure: Ira Keith's Hammeke 1, se se sw 13-19s-12w, Arb 3354 ft, abnd 3386.

Barton County — Failure: Jones & Shelbourne's Aetken 1, nw nw ne 28-19s-15w, Arb 3656 ft, abnd 3710.

Butler County — Failure: H & M Drlg.'s Stern 1, se sw ne 22-27s-6e, Miss lime 2697 ft, abnd 3062.

Kingman County—Failure: Cities Service's Kincaide 1, sw se sw 8-29s-5w, Arb 4492 ft, abnd 4525.

Pratt County—Failure: Huber & Hatfield's Shanley 1, c s½ ne ne 30-27s-13w, Miss lime 4274 ft, abnd 4585.

KENTUCKY WILDCATS

Hardin County—Failure: Illinois Mid-Continent's Ky. Rock Asphalt 4, 17-I-39, abnd 1507.

Muhlenberg County—Failure: B. Hackbush's Casebier 1, 15-J-30, abnd 2185.

NORTH LOUISIANA WILDCAT

Sabine Parish—Failure: T. L. James & Co.'s Brown 1, c ne sw 6-9n-12w, Blossom 2278 ft, massive Anhy 5246-4500 ft, abnd 6215.

SOUTH LOUISIANA WILDCAT

Allen Parish—Oberlin Oil Discovery: Humble's Mrs. J. A. Bel Estate 1-B, fr nec sect 33 go wly alg nl 1980 th sly at ra 660 to lcn in 33-5s-4w, Wilcox pay 12,650-669 ft, perf 30 shots 12,658-62 ft, flow 74.23 bbls 47.5-gr oil, 2,688,000 gas, 9/64-in, gor 5584/1, tp 630 lbs, td 13,150.

SOUTH LOUISIANA NEW PAY TEST

Acadia Parish — Egan Oil Discovery: Sun-Sohio's Hayes A-1, 38-9s-1w, pay 9897 ft, perf 44 shots 9897-9908 ft, flow 175 bbls 47.4-gr oil, 12/64-in, tp 3250 lbs, gor 640/1, td 10,649.

MICHIGAN WILDCATS

Allegan County—Failure: J. W. Lang Co.'s Stora 1, sw sw ne 18-3n-11w, abnd 1880.

Arenac County—Failure: Sohio & Talbot's Morley 1, nw sw nw 29-18n-4e, Dundee 2814 ft, abnd 3022.

Gratiot County—Failure Sohio Pet. Co.'s Joslen 1, se se se 22-10n-4w, Dundee 3198 ft, abnd 3240.

Huron County—Failure: Sand Products Co.'s Fee 1, se nw se 8-18n-12e, abnd 3200.

Midland County — Failure: Cities Service's McCartney 1, nw nw sw 6-15n-2w, abnd 1522.

Missaukee County — Failure: Freeman Oil Co.'s State 1, se se se 6-24n-7w, abnd 3260.

Montcalm County—Failure: Sohio Pet. Co.'s Doolittle 1, nw ne sw 11-11n-7w, Dundee 3402 ft, abnd 3513.

Schoolcraft County—Failure: C. E. Christensen's Fee 1, ne sw se 13-42n-16w, abnd 595.

MISSISSIPPI WILDCATS

Warren County—Failure: Frontier Oil Refg. Corp.'s F. C. Martin 1, nw nw 1-16n-5e, Wilcox 3117 ft, Eutaw 7360, Tuscaloosa 7919, Massive sd 8698, abnd 8880.

Chickasaw County—Failure: A. W. Hutchings' W. C. Stone Jr. 1, se sw 29-12s-5e, abnd 2506.

NEW MEXICO WILDCAT

Chaves County — Failure: DeKalb Agricultural Assn's White 2, c sw ne 30-10s-28e, elev 3740 ft, anhydrite 255, salt 521,1162, red sand 1162, lime 1597, San Andres 1638, Glorietta 2775, abnd 3505.

OKLAHOMA WILDCATS

Creek County—Failure: C. E. Beal's Young 1, se ne 24-18n-8e, abnd 3065.

Lincoln County—Failure: Hubble & Webb et al's Bukaty 1, ne ne ne 19-15n-6e, abnd 3370.

Lincoln County — Failure: R. H. Pierce's Hertz 1, sw sw se 7-15n-5e, abnd 3508.

Seminole County—Failure: Big Chief Drlg. Co.'s Mathis 1, nw nw sw 35-6n-6e, abnd 2486.

WEST TEXAS WILDCATS

Garza County—Failure: Honolulu Oil Corp.-Devonian Oil Co.'s Durrett 1, 2200 ft nsl and 440 ft wel E.L.&RR Co. 1304, elev 2942 ft, anhydrite 1350 ft, abnd 3616.

Pecos County—Failures: Geo. T. Abell et al's Scharff-Blackmon 1-22, 505 fr fr sw and 330 ft fr se lines H&TC Ry. 22, blk 3, elev 2411 ft, abnd 2044.

G. F. Aldrich et al's State Nat'l Bank (El Paso) 1, c sw ne T.&St.L. Ry. Co. 25, blk 140, elev 2491 ft, Clear Fork 2400 ft, Permian-Ellenburger contact 4590, Detrital 4665, Pre-Cambrian 4725, granite 4730, abnd 4745.

Val Verde County—Failure: B. E. Wilson et al's Wilson & Hodge 2, 1417 fr snl and 940 ft ewl GC&SF Ry. Co. 57, blk E, jkd and abnd 590.

WEST CENTRAL TEXAS WILDCAT

Hamilton County — Failure: Seaboard Oil Co.'s New 1, 4817 ft snl and 467 ft ewl A. C. Grimes sur 1-1188, elev 1438 ft, Marble Falls 3915, abnd 4212.

WEST CENTRAL TEXAS DEEP PAY TESTS

Jones County—Noodle Field Deep Failure: Humble's Riley Horton 1-B, 330 ft snl and 1263 ft wel T&P Ry. 40, blk 18, elev 1812 ft, Ellenburger 5400 ft, abnd 5618.

Jones County — Swan Field Deep Failure: Rhodes Drlg. Co.'s Swan 2, 4380 ft nsl and 1375 ft ewl of I. Miley sur 281, elev 1869 ft, Saddle Creek 2695, Swastika 3140-3315, Palo Pinto 4375, Mississippi 5330, Ellenburger 5405, flowed 192 bbls 38.5-gr through ¾-in from 2700-ft Saddle Creek perf, td 5520.

NORTH TEXAS WILDCATS

Archer County—Failures: Bridwell Oil Co.'s Wilson 1-J, 1626 ft nsl and 150 ft ewl S.P. Ry. Co. 1, A-412, abnd 1606.

Wayne King et al's Threet 1, 600 ft out nec sect 104, Jefferson CSL sur, abnd 1173.

Clay County—Failure: Wayne H. Hammon et al's McClellan 1, 1400 ft n and 1350 ft e of nwc HT&B Ry. 42, but in Chas. F. Stanley sur A-407, abnd 1401.

Throckmorton County—Failure: J. W. Carter et al's Wilhelm 1, 150 ft from se and 4790 ft from ne lines TE&L Co. sect 651, elev 1229 ft, abnd 778.

Wichita County—Failure: W. O. Ferguson et al's Honaker 1, 300 ft snl and 750 ft ewl R. Meade sur A-185, abnd 1878.

Young County — Oil Discovery: Hanlon & Buchanan's Lena Kendall 1, 2271 ft snl and 2622 ft ewl sect 4, J. C. Crosby sur A-1722, elev 1231 ft, Bend 3466, flowed 316 bbls 42-gr, gor 1800/1, natural through ¼-in from Bend 3466-81.

SOUTH CENTRAL TEXAS WILDCAT

Travis County—Failure: Morris & Connolly's L. Lundgren 1, 715 fr swl 430 fr sel 113-ac tr 8000 fr swl 5000 fr sel L. Kimbro sur 64, Pecan Gap 570 ft, Serpentine 712, abnd 900.

SOUTHWEST TEXAS WILDCATS

Duval County—Failure: Southern Minerals Corp.'s Juan Benavides 1, 2400 ne of swl 2970 se of nwl 1584-ac lse on line between blks 10 & 36, El Mesquite Gr, abnd 3371.

McMullen County — Gas Discovery: J. W. Gorman's Roos Bros. 1, 990 fr wl 330 fr nl AB&M sur sect 75, 1½ mi s of S. Campana fld, pay 1926-73 ft, perf 30 shots 1929-34, 1945-50 ft, flow 2,200,000 gas, td 3176.

Webb County—Failure: Geo. K. Taggart's Lod Maglia 1, 330 fr nl 1703 fr wl 1792 fr el 200-ac lse sect 723, abnd 2746.

SOUTHWEST TEXAS NEW PAY TEST

Starr County—La Reforma Discovery: Baldridge & King's A. Guerra Est. 1, 1000 e of wl tr 7, San Jose Gr, 320-ac trs, pay 6113 ft, perf 9 shots 6145-48 ft, flow 146.36 bbls 42-gr oil, ⅛-in, gor 612/1, tp 940 lbs, cp 1020 lbs, td 6150.

EAST TEXAS WILDCAT

Hopkins County—Failure: Delta Drlg. Co. et al's Livingston 1, 3350 ft snl and 675 ft wel

of Nacogdoches University League 10, elev 460 ft, Nacatoch 1450 ft, Pecan 2365-2615, Austin 3818-3900, Sub-Clarksville 4012-27, Woodbine 4452, Georgetown 5134, Goodland 6175-6218, Paluxy 6242, Glen Rose 6575, Gloyd 8011, Travis Peak 8420, abnd 8642.

LOWER TEXAS COAST WILDCATS

Dewitt County — Failure: Amerada et al's F. C. Dreier et al 1, 660 fr nwl 660 fr nel 660 fr sel 40-ac tr, 680 se sel P. Quinn sur, abnd 9123.

Kleberg County—Failure: Fred M. Wood's Annie M. East 1, 330 fr sl 631.2 fr el sect 34 lot 8 and 40-ac lse, abnd 8251.

Live Oak County—Failure: Sid Katz's Leonard Jacob Est. 1, 2840 fr nl 434 fr el Louis Ayara sur, 385-ac lse, abnd 1383.

Nueces County — Failure: Santa Clara Oil Co.-Maguire Industries' Nina G. Stewart 1, 400 fr wl 890 fr el 206-ac lse, blk 1, Mariano Lopez de Herrera Gr, abnd 7515.

San Patricio County—Failure: Southern Minerals Corp.'s T. Morrow et al 1, 467 fr n&el blk 2 and 209-ac lse, n½ Geo. Morris Lge, abnd 6312.

UPPER TEXAS COAST WILDCATS

Chambers County—Failure: Sun's Frankland 1, 4700 sw Mayes prod, 660 fr n&el 875-ac and Henry Barker sur, abnd 8917.

Hardin County—Failure: C. S. Gainer's A. Guedry Est. 1, 225 fr sl 150 fr wl Anna Guedry-W. C. Christian et al 86.87-ac tr, M. Chevano sur, abnd 2510.

UPPER TEXAS COAST NEW PAY TESTS

Matagorda County — Lucky Oil Discovery: Stanolind's J. E. Thompson 1, (OWDD) 1300 w alg sl 660 n at ra on 588.48-ac tr, new pay 10,169 ft, perf 69 shots 10,175-198 ft, flow 23-24 bbls 38.6-gr, 3,290,000 gas, 12/64-in, gor 143-000/1, cp 3886 lbs, otd 9700, td 10,248.

Matagorda County — Sugar Valley Oil Discovery: Superior of Calif.'s W. J. Culbertson 1, start n cor sect 84, go 330 ne alg sel sect 81, 330 nw at ra to lcn, 253-ac tr, P. Burnett-A. S. Sojourner sur, pay 8274 ft, perf 8 shots 8274-76 ft, flow 256.10 Bbls 43.8-gr oil, 0.5% wtr, 2,590,000 gas, 16/64-in, gor 10,117/1, tp 2540 lbs, td 10,662.

WESTERN CANADA WILDCATS

Central Alberta Plains—Kinsella Gas Discovery: Imperial Oil Ltd.'s Kinsella No. 5 lsd 7 11-48-9w4th, completed 1940 in Viking sand (Upper Cret.); initial O. F. potential 8148 Mcf daily.

South Alberta Plains — Foremost Failure: California Standard's Foremost-Province No. 4, lsd 2 28-5-11w4th, completed 4251 ft Devonian dolomite.

Indian Lands Offered

Sealed bids for oil and gas leases on 108 tracts of restricted Indian lands of the Five Civilized Tribes will be received at the office of the superintendent at Muskogee, Okla., up to 10 a.m., March 12. A total of 8609.54 acres are being offered.

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■ Standard drilling outfit, complete, A-1 condition. New Young 145 hp motor, new 5000-ft. wire lines. $8500. L. A. Bolte, R. #2, Bunswick, Ohio, Phone W. Richfield 2423.

■ FOR SALE: 55 Heavy Duty Wichita Falls Spudder, Center spool, new style reverse, chain driven sand reel, chain driven casing drum, high and low speed; Mast 52′, 5 x 14, with catapillar motor #60, combination carburetor, all in good condition, priced to sell. W. W. Holmes, Box 567, Amarillo, Texas.

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1—Power pump—5 x 10 Gardner Oil Bath c/w Waukesha—6 cyl. Type SRK 85 H.P. Motor—steel skids	$1,850.00
1—Power Pump — 4 x 6 Fairbanks-Morse Oil Bath c/w Allis-Chalmers —4 cyl. Type E—52 H.P. Motor—steel skids	1,050.00
1—Motor—Le Roi—4 cyl. Model 471	450.00
1—Crown Block—Emsco—RB—36″—5 sheave—Type EA-57 c/w catline sheave	750.00
1—Swivel—Ideal—6″—Type AA	700.00
1—Rotary — Emsco — RB — 25½″ — Type DA	1,000.00
1—Pulley—66″—PD—12F—Grooved (new)	150.00
1—1.5 K.W.—Kohler Light Plant	350.00

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■ FOR SALE: $1000.00 cash. 6¾ x 12 open end type Union Tool Power Mud pump, Heavy duty gear end, Mission Liner's rods, valves & seats. Call or write: C. T. Alford, 2107 Grant Street, Wichita Falls, Texas.

■ FOR SALE: Pumping units: 2 Oilwell SC-20; 2 Jensen 14; 1 Reed 14; 6000 ft ¾-in sucker rods; Casing pumps, 7-in. and 5½-in.; Spudder attachment to Wilson winch w. cable tools. Seguin, Texas, P. O. Box 926, phone 682.

■ Rotary Drilling Rig suitable for shallow drilling Mast Poles, WitchTex Drawworks, 5 7/8 x 12 Oil Well Pump, 2000 ft. 4½ in. Drill pipe. Recently finished 1900 ft. contract. Rig is complete. Price $8,500. C. G. Hart, 2400 Grant St., Wichita Falls, Texas.

■ FOR SALE: Placer Gold Mine, 20 acres 70 miles north Phoenix. Ample water eight months. Yearly easily developed. Estimated 250,000 yards averaging dollar, and unrecovered free gold from Black sand over five dollars ton. About 250 lbs. Black sand in ton gravel. Price $25,000 Cash. Colonel Charles Rutherford, Owner, Heard Building, Phoenix, Arizona.

2—80 H.P. Tips Semi-Diesel Engines

2—48 KWKVA Western Electric Generators with air compressor, tank, and switchboard. Price entire lot.....$7500.00

MITCHELL MANUFACTURING CO.
Fort Smith, Arkansas.

SITUATION WANTED

■ Released naval officer—graduate Petroleum Engineer with 5 years oil field experience, desires contact with concern engaged in oil field work. Address: Box 97, c/o The Oil Weekly Houston, Texas.

■ Ex-Naval officer graduate engineer with eight years oilfield engineering and seven years management and administration. Engineer, executive assistant or similar position preferably with Independent. Address: Box 99, c/o The Oil Weekly, Houston, Texas.

■ Driller for 18 years would like a job with company in Texas, Florida, or Oklahoma. Desire guarantee of steady work. George L. Reed, Box 402, Woodsfield, Ohio.

LEASES, DRILLING ACREAGE, ETC.

■ Selected 10 yr. merchantable Oil & Gas leases, in advance of the play, along Southern rim of the Anadarko Basin, close to new fields; titles and geology checked, $7.50 to $10.00 A.; L. D. Wise, geologist, 208 Gensman Bldg., Lawton, Okla.

HELP WANTED

■ WANTED: Sales Engineer by oilfield engine distributor. Engineering graduate with thorough knowledge of East Texas Oilfield. Address: Box 95, c/o The Oil Weekly, Houston, Texas.

LAND & LEASE NEGOTIATION

Man capable of obtaining land permits and negotiating oil land leases for oil company in Venezuela. Must have thorough knowledge of Spanish and be familiar with Latin American people. Salary, depending on training and experience, to range from $600.00 to $750.00 a month plus living allowance. Please write full particulars to T-13, P. O. Box 3414, Phila., 22, Pa.

■ **SEISMIC PARTY CHIEF** wanted by well known established contracting company. Must be college graduate with at least five years experience in interpretation preferably Gulf Coast. Excellent salary and opportunity. Only highly experienced applicants will be considered. Write Box 1, The Oil Weekly, Tulsa, Oklahoma.

TWO DISTRICT SALESMEN—By manufacturer of production equipment for Texas and Louisiana territories. Factory training, salary, expenses and car allowance. Helpful supervision and opportunity for advancement. Give qualifications and business experience with reply to: Box 98, c/o The Oil Weekly, Houston, Texas.

WANTED TO BUY

■ WANTED TO BUY: one core drill rig, capable of drilling 700 feet, with a supply of rods. Address: Merry Brothers, Demopolis, Alabama.

NOTICES

■ **Manufacturers Agent, Gulf Coast area desires one additional account. Address: Box 88, c/o The Oil Weekly, Houston, Texas.**

■ WANTED: Operators to finance and further develop proven and semi-proven oil and gas properties in Montana.
Hamilton & Hamilton, Inc.,
Box 1605, 535 Ford Bldg.
Great Falls, Montana.

SERVICES

ATTENTION SHALLOW WELL OWNERS
—If your production has gone down to a few barrels per day due to paraffin, wax, sand, shale, or sediment causing plugged liners or screens to fail to give the production they should, and are interested in having your wells serviced by a newly developed and proven system of hydraulic liquid and chemical treatment, on the basis of pay from the increased production, write to **National Well Servicing Corporation, 315 Gravier Street, New Orleans 12, La.** All inquiries will be treated in strict confidence.

POSITION WANTED BY SERVICEMAN

■ Returned Naval veteran with seven years experience as business executive, desires connection in oil industry. Married, 32 years of age with college education in Petroleum Engineering and Business Administration. Experience with both major and independent oil companies. Am ambitious, aggressive and shall welcome inquiries on complete details, references, etc. Presently residing in Dallas. E. J. Muth, 4301 Lomo Alto Dr., Dallas 4, Texas.

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CONDENSERS
and
HEAT EXCHANGERS

If you need condenser or heat exchanger repairs **in a hurry** call us. We specialize in fast, high quality work.

25 Years Successful Experience

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"Service Not Promises"
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FM Radio
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Solve your tough communications problems by using this equipment. Proved during war and doubly preferred by Communications men in all branches of the oil industry.

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WILDCAT STARTS

ARKANSAS

Columbia County: McAlester Fuel Co.'s W. H. Russ 1, c sw sw 12-16s-20w, lcn.

CALIFORNIA

Kern County: C.C.M.O. Co.'s 1-32, 32-11n-19w, Grapevine area, lcn.

Richfield Oil Corp.'s Leutholtz A-6, 22-11n-23w, Santiago area, rig.

J. A. and Dan Foreman's 39, 26-25s-18e, Devils Den area, drlg.

U. S. Drlg. Co.'s Olcese 1, 17-28s-29e, Round Mountain area, ru.

Solano County: Amerada Pet. Corp.'s Millar Community 2, 2-6n-2e, Dixon area, lcn.

Tulare County: G. B. Finch Oil Co.'s Finch 2, 7-24s-23e, Trico area, rig.

Los Angeles County: R. W. Jerman's Gothard 1, 27-5s-11w, Huntington Beach area, lcn.

A. W. Lyddon, Operator's Lamb Community 1, 6-6s-10w, Huntington Beach area, foundation.

Rothschild Oil Co.'s Newland 1, 12-6s-11w, Huntington Beach area, preparing to move in.

ILLINOIS

Cumberland County: Jarvis Bros. et al's Miller 1, se ne nw 20-10n-7e, lcn.

Jasper County: Pure's Dodd 1, s½ sw ne 6-6n-11e, lcn.

Shelby County: Sohio's Flenner 1, se ne nw 17-10n-4e, lcn.

Wayne County: J. J. Lynn's Dye 1, n½ nw nw 2-1s-7e, lcn.

KANSAS

Rice County: B&R Drlg.'s Scott 1, sw sw sw 1-20s-10w, drlg 1450 ft.

Rooks County: Bird & Boreing et al's Veverka Estate 1, c s½ sw sw 27-8s-19w, rur.

KENTUCKY

Butler County: P. Fulk et al's Belcher 1, 21-1-32, drlg.

NORTH LOUISIANA

Caddo Parish: Union Prod.'s Fly 1, 16-19n-16w, 6500-ft test.

Madison Parish: S. W. Richardson's Frederick Hooten 1, 31-18n-12e, lcn.

Morehouse Parish: Pure's Robinson 1, c ne se 17-23n-8e, Smackover test.

Richland Parish: Chas. G. Glasscock Co.'s L. & E. Hightower 1, se se 5-15n-7e, Paluxy test.

J. A. Humphrey-Toddie L. Wynne's M. D. Broughton 1, 36-16n-6e, Paluxy test.

Sabine Parish: Carter's La. Long Leaf Lbr. Co. 1, c sw sw 27-7n-10w, 9000-ft test.

MICHIGAN

Allegan County: J. F. Reed's Jones 1, nw nw nw 4-3n-13w, rig.

Newaygo County: MacCallum & Craft's State 1, w½ nw sw 35-16n-11w, lcn.

Van Buren County: Circle Drlg. Co.'s Geiger 1, nw nw nw 18-1s-13w, lcn.

MISSISSIPPI

Wayne County: Humble's Masonite B-1, swc 21-9n-7w, lcn.

NEW MEXICO

Sandoval County: F. B. Umbarger et al's Armijo Grant 1, c nw nw 1-12n-3w, dr 910 ft.

OKLAHOMA

Choctaw County: R. O. Haubelt's Schuessler 1, sw se ne 14-6s-14e, drlg 1390.

McIntosh County: Public Service Co.'s Link 1, se nw 10-10n-13e, lcn.

Osage County: A. G. Oliphant's Osage 1, sw sw sw 31-26n-5e, lcn.

WEST TEXAS

Garza County: Honolulu Oil Corp.-Devonian Oil Co.'s H. F. Wheatley 1, 2200 ft snl and 440 ft wel T.T. Ry. Co. 1306, blk 1, rur for San Andres test.

WEST TEXAS OUTPOST

Yoakum County: E. J. McCurdy, Jr., and McElroy Ranch Co.'s M. C. Baumgardner 1, 660 ft out swc PSL 12, blk L, 1-1/16 mi se of Landon pool, lcn 5000-ft San Andres test.

TEXAS PANHANDLE

Hartley County: Pure Oil Co.'s E. R. Robinson 1, ne ne nw H&TC Ry. 152, blk 47, lcn 5000-ft test.

WEST CENTRAL TEXAS

Jones County: Alder Oil Co.'s J. J. Steele 1, 330 ft wel and 990 ft nsl of nw T&NO Ry. 6, blk 2, lcn 3000-ft cable test.

Parker County: Continental Oil Co.'s C. P. Woody 1, 660 ft out of most southerly nwc of D. A. Neal sur A-2104, mim for 6600-ft Ellenburger test.

Taylor County: R. H. & L. F. Roark et al's L. N. Brown 1, 4057 ft snl and 3726 ft wel of Jose Gabo sur 128, lcn 2850-ft test.

NORTH TEXAS

Archer County: E. P. Bowen et al's A. L. Harris 1, 450 ft out swc block 71, J. W. Harris subdiv, lcn 1450-ft rotary test.

Bridwell Oil Co.'s M. H. Ingersoll 1, 2410 ft nsl and 850 ft wel S.P. Ry. Co. 1, A-434, lcn 2000-ft test.

Cooke County: J. W. Hastings et al's Atcheson Est. 1, 330 ft out sec T. Polk sur A-876, lcn 3500-ft rotary test.

Throckmorton County: S. D. Johnson and Russell Maguire's G. W. Buchanan 1, 150 ft out of sec sect 927, TE&L Co. sur, lcn 1500-ft test.

Wichita County: Benson Bros. et al's Mrs. S. Foster 1, 1520 ft snl and 2840 ft wel SA&MG sect 1, A-272, lcn 2000-ft test.

Akin-Dimock et al's Goetze Bros. 1, 600 ft snl and 1400 ft ewl sect 2, Day Land & Cattle Co. sur A-711, lcn 2500-ft test.

B. W. J. Oil Co.'s Bickley 1, 2850 ft snl and 150 ft ewl sect 2, J. F. Torrey sur A-598, lcn 400-ft cable test.

Frank Wood et al's Robinson 1-B, 1170 ft nsl and 750 ft ewl blk 321, Waggoner Colony Lands, lcn 2500-ft rotary test.

Wilbarger County: Frank Wood et al's Koehn 1, 2420 ft snl and 1540 ft ewl H&TC Ry. 24, blk 13, lcn 2000-ft rotary test.

EAST TEXAS

Navarro County: Tex Harvey Oil Co.'s J. L. Jackson 1, 755 ft from e and w and 350 ft snl of 101.2-ac tract, or 350 ft from nw and 3125 ft from ne lines John McNeal sur, ¼-mi sw Angus, lcn Woodbine test.

SOUTH CENTRAL TEXAS

Bexar County: Ernest J. Biskamp's State of Tex. 1, 330 fr sl 1530 fr sly el 280-ac San Antonio State Hospital ld, 5500 fr el 800 fr nl Wm. Small sur 26, 1200-ft test.

Dimmitt County: Humble's Mogford & Kimble 1, 3300 fr nl 1320 fr wl 483.5-ac tr and Trinidad Sanches sur, dr 110 ft on 3200-ft test.

Edwards County: Meco Prod. Co. et al's J. W. Holman 1, 1815 fr el 330 fr sl CCSD&RGNG sur 25, 1500-ft test.

Ray E. Pool's Joe Sid Peterson 1, 660 fr nw&swl sw½ nw¼ sect 44 ME&RR sur, 5500-ft Ordovician test.

SOUTHWEST TEXAS

Jim Hogg County: Humble's Mrs. A. M. Bass 23, 3300 fr el 9796 fr sl San Rafael del Norte Gr, 2834 w of No. 18 dry hole 3000 w nw of Bass 17, nearest Kelsey fld prod, 10,000-ft test.

Killam-McLean's R. Holbein 1, 1336 fr wl 5126 fr sl 120-ac lse, Las Animas Gr.

LOWER TEXAS COAST

Brooks County: Humble's W. B. Gardner-State 1, 1980 fr nl 660 fr el J. F. Dawson sur, 598-ac lse, w of Mariposa fld, 10,000-ft test.

Willacy County: Humble's Sauz Rch-Jardin 1, start sec sh 46 go n alg wl 10,000-ac lse th at ra ely 24,000 to lcn, San Juan de Carricitos Gr, dk for 12,000-ft test.

UPPER TEXAS COAST

Harris County: Jack W. Frazier's Greens Bayou-Homesite 1, 330 fr s&el S. C. Hiroms sur and lot 1, e ne of Brooks 1 dry hole and dry hole on same lse, spud 5500-ft test.

Hinkle Drlg. Co.'s Mrs. Minnie H. Allen 1, 660 fr nl 330 fr wl 80-ac tr and lot 31, Blas Herrera sur, 8200-ft test.

Matagorda County: Magnolia's Live Oak Farms 1, 660 fr s&wl 190.03-ac lse, J. W. E. Wallace sur, 11,500-ft test.

WESTERN CANADA

South Saskatchewan — Davidson: Imperial Oil Ltd.'s Davidson No. 2, lsd 13 10-27-2w3rd, ru.

South Alberta Plains—Burdett: California Standard's Burdett-Province No. 4, lsd 16 13-7-13w4th, ru.

Central Alberta Plains—Kinsella: Imperial Oil Ltd.'s Kinsella No. 8, lsd 11 22-49-11w4th, co-ordinates 1825 ft s 1980 ft e of nw¼ of sect, lcn.

Michigan Lease Sale

Operators paid an average of 79 cents an acre for 17,016 acres of state land leases for a total bonus of $13,469 at the February 1 sale conducted by the Department of Conservation. The 79 cent average compared to an all-year 1945 average price of 66 cents an acre. The Pure Oil Company's bid of $2100 for the SE NE 13-17n-7w, Osceola County, a 40-acre tract offsetting a Pure wildcat showing gas and distillate at 5037 feet, set the sale high.

SQUEAKS from the BULL WHEEL

The Successful Woman

She's something like an ostrich
The dumbest of the lot;
She carefully hides the things she knows,
But not the things she's got.

Cigarette Money

A limousine caught up with a small car and the wealthy owner of the big automobile couldn't resist the temptation to jolly the other guy a little. "Heavens, man, what is it about your car that rattles so loud?"

"Oh, that's just $10,000 in loose change rattling around in my pocket."

What the Oil Industry Wants to Know Is—Will Their Wildcats Produce?

To prove the value of our services we will report, in advance of completion, the outcome of several wildcat wells being drilled by Major Oil Companies in various states. Reports will be sent to those interested in our services, with no obligation.

CHEMICAL ANALYSIS SURVEYS
3110 Holmes Street Kansas City, Mo.

Standco
NO-SMOKE
STANDCO BRAKE LINING
Is the driller's best friend because it makes the easiest brake known and "feeds off" evenly while drilling. It never scores brake rims. See page 2808 Composite Catalog.
Standco Brake Lining Co.
HOUSTON

Eve's Heritage

"Why do you have an apple as your trade mark? You're a tailor."

"Well, if it hadn't been for an apple, where would the clothing business be?"

No Shave Needed

"What denomination are you folks?"

"My mother is Presbyterian, my dad is Methodist, and I'm radio."

Chip Off the Old Boar

"Willie, you're a pig. You know what a pig is, don't you?"

"Sure, Daddy. A pig is a hog's little boy."

Just Like a Woman

An old retired pipeliner took a room in a hotel and crawled wearily into bed. Just then in bounced a girl—blonde, luscious and scantily clad.

"Oh," she cried. "I must have gotten in the wrong room."

"Yep," said he sadly. "Not only the wrong room, lady, but you got here 40 years too late."

Love and Learn

"Did you knock on the traveling man's door and wake him as I told you?" inquired the landlady of the maid.

"Yes'm, but he didn't wake up, so I finally had to go in and shake him."

"Good heavens! Don't you know better than to go into a traveling salesman's room?"

"Yes'm. I do now."

He'd Put on the Dog

"If that dog is pedigreed I'll buy him from you."

"Pedigreed? Listen, if that dog could talk he wouldn't speak to either of us."

This Curious World

Powder on your coat sleeve will make your wife blow up.

Have you heard about the little moron who didn't take a street car because his wife would make him take it back?

A careless worker is an accident going somewhere to happen.

It takes a baby two years to learn to talk and 60 years to learn to keep his mouth shut.

These new stockings made out of coal, wood and rubber are going to be mighty confusing to the women. When they get a run, they won't know whether they've got a clinker, a splinter or a blowout.

Every man has his price and a lot of them hold bargain sales.

A bride's thoughts as she walks into a church: "Aisle, Altar, Him."

As a newlywed explains it, the difference between wall beds and twin beds is that you take a wall bed down and put it on the floor and you take twin beds down and put them in the basement.

Cynical Susie describes a gentleman as a man you don't know very well.

It's okay to call a plane "she" but not to call a she plain.

There weren't many comforts and no luxuries at all back in Adam's day, but few men have had more fun with a spare rib.

A widow has one advantage over other women. She can give references.

"Best Bet Yet"

This reinforced disc of PBX synthetic rubber has many time and money saving advantages. Reduces fire hazard—Reduces costly fishing—Cleaner tubing and floors—Making for safer working conditions—Protection to crew—Automatic action.

See Composite Catalog

Patterson-Ballagh TUBING WIPER
Los Angeles 1 • Houston 10 • New York 6

BETTER
Steel Forgings for
OIL WELL EQUIPMENT
BEAUMONT

WELL WORKS COMPANY
BEAUMONT, TEXAS

DON'T GAMBLE on your WATER WELLS

Avoid expensive delay—
Avoid failure to get water.
Call us for all your water well requirements. Speed and reliability is our motto.

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Mechanical and Low Temperature, Invisible Welding for Industrial Motor Blocks, Cylinder Heads, Pumps and Machinery without Preheating or Dismantling.

Work done in our plant or in the field

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C. 4-4339 HOUSTON 2, TEXAS

Stainless Steels

A 100-page pocket-size handbook presenting information on 26 types of stainless steels has been published by Allegheny Ludlum Steel Corporation, Brackenridge, Pa., and is available at no cost. It brings up to date, supersedes and amplifies the stainless steel chapters of the earlier "Handbook of Special Steels" and includes most of the data and information that is available on file-size "Blue Sheets" for the various types of stainless steel.

The handbook contains a 44-column finder chart giving analyses, properties, hot working temperatures and heat treatment of the different types and a general discussion of types and properties of stainless. This is followed by a table of corrosion resistance of four leading types of stainless to 230 chemicals and common materials.

Fabrication methods and procedures, occupying 40 pages, describe welding methods; press forming, drawing and blanking; machining techniques; spinning qualities, tools and methods; upsetting and forging; riveting, shearing, soft soldering, silver soldering, annealing and heat treating, grinding, polishing and buffing, and surface treatments, including removal of welding flux, degreasing, sandblasting, pickling, and passivating.

Stainless steel products, including plates, sheet, strip, bars, forging billets, tube stock and tubes, angles, wire, castings, forgings, and clad steel (Pluramelt) are described in a 20-page section. Final pages contain general tables of bar weights, weights of sheet, weights of tubes, feet per pound of wire, decimal equivalents of fractions of an inch, and temperature conversion.

Pump Operation

Edited for the non-technically educated mechanic or operator of pumps or compressors, Audel's Pumps, Hydraulics, Air Compressors, compiled by Frank D. Graham and published by Theo. Audel & Company, 49 West 23rd Street, New York 10, (price $4) discusses design and operating problems through the question-and-answer method, with many line drawings and parts illustrations to bring out the details involved.

The book is divided into three parts, the first discussing pumps, their applications, and auxiliaries; the second section is more directly a discussion of hydraulics; while the final or third part deals with air compressors and equipment used with them.

A compendious index, covering 24 pages, aids the beginner in finding that particular portion of the handbook which is most directly applicable to his problems.

New Mexico Unit Area

The United States Geological Survey announces a report dealing with the Grayburg Cooperative and Unit Area, Eddy County, New Mexico. The report consists of 12 pages of text with ten accompanying maps and charts. It was prepared in order to assist the Grayburg Unit Association in determining the proper locations of gas-injection wells and the best methods for the future operation of the pressure-maintenance system being installed to retard decline of pressure in the reservoir and increasing the ultimate recovery of oil from the Grayburg zone. The report presents factual engineering information of particular interest to the unit operators of the Grayburg area and of general interest to operators of similar units in other areas. Copies may be obtained free of charge upon request from the Oil and Gas Supervisor, Geological Survey, Federal Building, Roswell, N. M.

World Security

World security will strengthen democratic tendencies inside Russia, Harold D. Lasswell states in a research paper prepared for the Committee for Economic Development Research Division, just published by the McGraw-Hill Book Company, New York.

Entitled "World Politics Faces Economics," the paper offers, in part, an analysis of the political and economic factors involved in preventing World War III. Emphasis is placed on the importance of Russia and America as the world's bi-polar powers. Efforts of other nations to achieve security will move them into the orbit of one or the other of these two powers.

Both Russia and America "proclaim the dignity and worth of the individual," but the achievement of this democratic ideal depends on the solution of two quite different problems, one political and one economic, Lasswell points out.

Russia's problem is to modify an all-encompassing bureaucratic dictatorship into a flexibly balanced society, says Lasswell. "Russia needs to move from centralization to decentralization, from dictatorship to democracy, from regimented communication to free communication."

WELGEL
TOP QUALITY COLLOIDAL BENTONITE

Buying WELGEL, you are getting not only the best bentonite, but also security for dependability and prompt delivery service.

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Houston 1, Texas

GEORGE A. WILSON, formerly director of the Supply and Transportation Division of PAW, has been elected a director and president of the Interstate Natural Gas Company, succeeding **F. H. LERCH, JR.,** and has been appointed assistant to **MARION W. BOYER,** vice president of Standard Oil Company of New Jersey and general manager of its Baton Rouge refineries. He will maintain his office in Baton Rouge. A native of Mansfield, La., Wilson received his law degree from Tulane University, practiced law in New Orleans, was appointed in 1940 as general counsel to the Louisiana Conservation Commission and Minerals department, and joined Standard Oil in 1941 to head division activities in Shreveport on production, pipe line and crude oil activities. Before he went on leave with PAW, he was a director of the Mid-Continent Oil and Gas Association. Interstate headquarters are in Monroe, La.

George A. Wilson

* * *

WILLIAM M. IRISH III, vice president of the Atlantic Refining Company and head of the Dallas office of the company's crude purchasing and marketing department the past 20 years, has retired owing to failing health which was impaired by an airplane crash.

* * *

J. HARRY WOOD JR., vice president and general manager of The Atlantic Pipe Line Company, Dallas, will assume charge of purchasing and marketing in the Southwest along with his pipeline duties.

* * *

ROBERT S. BRENNAND, JR., Permian Basin district landman for the Standard Oil Company of Texas and an employe for 20 years, has resigned to operate as an independent, retaining his residence at Midland, Tex.

* * *

L. G. YARBOROUGH, West Texas district landman for Stanolind Oil & Gas Company, has resigned to operate as an independent, and is succeded by **W. H. GROUND,** who has been district landman for the company in East Texas with headquarters at Tyler.

* * *

DR. RICHARD R. PRIDDY, district geologist for The Texas Company in Jackson Miss., has joined the teaching staff of Millsaps College of that city. He will conduct courses in geology and chemistry. Dr. Priddy went to Jackson with Kingwood Oil Company. He later joined the State Geological Survey and coauthored several mineral resource reports. He became connected with Texas about four years ago.

* * *

W. A. THOMAS, who concluded his Army service in the European Theater as a lieutenant colonel has rejoined The Ohio Oil Company as its West Texas-New Mexico district geologist with headquarters at Midland, Tex. He was the company's Michigan district geologist prior to entering the service in 1942.

* * *

E. F. KINDSVATER has been appointed manager of the new Chemical Engineering Department of Phillips Petroleum Company, Bartlesville, Okla. **P. M. ARNOLD** was named assistant manager. Kindsvater has been with Phillips since 1930, starting in the general engineering department in charge of inspection of materials and equipment for the Phillips Pipe Line Company. In 1931 he started the development of the general engineering department's test division. In 1940, he became chief engineer and held this position until his appointment as manager of the chemical engineering department. Arnold started with Phillips in 1937. He was first employed in the research department. In 1943, he was appointed manager of the process engineering division of the chemical products department.

E. F. Kindsvater

H. W. BELL will be succeeded in March by **PAUL MONTGOMERY** as engineer-geologist of the Louisiana office of natural gas conservation. Bell headed the Louisiana State Conservation Department's Minerals Division in 1925-26, and again in 1941-44.

* * *

PAUL M. BROWN, president of the Bayou State Oil Corporation, has been chosen chairman of the education committee of the Shreveport Chamber of Commerce. Others placed in key Chamber of Commerce posts include: **MAJ. B. A. HARDEY,** president of the Independent Petroleum Association, vice chairman, national affairs; and **H. C. WALKER, JR.,** an attorney with large oil interests, chairman of the legislative and taxation committee.

RICHARD ROLLINS, director of public relations of The Atlantic Refining Company, has been elected secretary of the company.

* * *

J. A. SMITH has rejoined Ashland Oil & Refining Company as land man at Evansville, Ill. He was discharged as a major after 51 months with the Army.

* * *

D. M. PERKINS, Tulsa, has joined the National Associated Petroleum Company as scout in the Illinois basin, with headquarters at Mt. Vernon, Ill.

* * *

TOM BeBOW has rejoined Cities Service Oil Company, Bartlesville, Okla., as director of advertising and news. DeBow, just discharged after 22 months in the Navy, has been with Cities Service for 19 years.

TYPE G PACKER
EASY TO SET
UNDER ALL CONDITIONS
All the facts point to this: "American" specifications and construction equip this packer for heavy duty performance! In addition to being easy to set . . . this packer has extra-large friction springs; full tubing-size through entire length of packer; large, heat-treated slips and large bottom guide!
Drawing in circle shows why this Type G Packer is so easy to set! You simply turn to the right and set down. There's no chance of getting hung up!
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IRON & MACHINE WORKS CO.
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Remember, there is an "American" service man in every active field!

MEN IN THE INDUSTRY NEWS

J. H. GRAHAM has been appointed assistant manager for the production and drilling departments of Continental Oil Company, East of the Rocky Mountains, with headquarters in Houston. He will direct and coordinate unitization pertaining to producing fields in all regions, and will work with Continental's natural gas and gasoline division to establish and expand market outlets for natural gas. Prior to joining Continental in October, 1945, Graham was district director of the Natural Gas and Natural Gasoline Division of PAW, District 3.

J. H. Graham

• • •

H. D. (DEEP) HENDERSON has resigned as superintendent of the Southern Region for Continental Oil Company, Houston, to become district land manager for Sohio Petroleum Company in Houston. He was with Continental 16 years.

• • •

L. H. HUMPHREY of the industrial relations department, Shell Oil Company, Tulsa, showed a motion picture entitled "Flight Log" at a luncheon meeting of the Tulsa Geological Society.

• • •

R. E. GILE, former West Texas division manager of Bay Petroleum Corporation, has become associated with the Rotary Engineering Company, a Midland, Tex., firm specializing in well logging and petroleum laboratory service. He will assume charge of a new district office to be located at Casper, Wyo.

KENNETH R. KNAPP, chief engineer for American Gas Association since 1930, has been appointed assistant director of the association's testing laboratories in Cleveland and Los Angeles. Following his graduation from the University of Pennsylvania in 1911, he spent 18 years in various engineering capacities with the United Gas Improvement Company before joining the AGA, in 1929 to take charge of pipe joint research.

• • •

CHARLES G. LEHRER, West Texas scout for the Tide Water Associated Oil Company, has resigned to become associated with **ROBERT G. ANDERSON,** consulting geologist, with headquarters at Abilene, Tex.

• • •

R. B. PAXSON formerly chief geologist for Sunray Oil Corporation in Tulsa, has opened an office in Houston as a consulting geologist.

• • •

R. MERRILL HARRIS and **WILLARD M. PAYNE** have formed a partnership, Harris & Payne, consulting geologists, with offices at 100 East Pearl Building, Jackson, Miss. Payne was formerly with The California Company.

• • •

W. F. BOWSER, former manager of Sunray Oil Corporation's land and geological department in Kansas, has been named chief geologist for Sunray with headquarters in Tulsa. He will be succeeded by **SHERILL A. SHANNON,** assistant geologist for Sunray in Kansas. Bowser has been with Sunray since 1944 following his resignation from the Lion Oil Company. He has also been associated with Cities Service Oil Company and the Darby Petroleum Corporation. Shannon, before joining Sunray, served for several years on the geological staff of Cities Service Oil Company.

• • •

M. A. RICKETTS is scouting for Sinclair Prairie Oil Company in southern Oklahoma. Ricketts, just out of the Navy, was stationed at Corpus Christi when he enlisted.

NATHAN R. PATTERSON, president of Patterson Steel Company, Tulsa, has been elected president of the Tulsa Chamber of Commerce. He is also a member of the National Association of Manufacturers' employers-employes committee, a director the American Institute of Steel Construction, a member of the Oklahoma Society of Professional Engineers and Construction League, and a past president of Central Fabricators Association, of Chicago. His own company serves the oil industry on three continents.

Nathan R. Patterson

• • •

JOHN S. REED has been appointed manager of the Manning, Maxwell & Moore manufacturing plant in Tulsa, replacing **W. W. SAWYER,** resigned. Reed has been with the firm at Bridgeport, Conn., for two years.

• • •

J. N. BAUMAN, vice president, White Motor Company, Cleveland, addressed the Petroleum Motor Transport Association of Oklahoma in Tulsa.

• • •

W. G. WINSLOW has been appointed sales representative in South America for four American manufacturers. He will handle sales of the Falk Corporation's speed reducers and flexible couplings, the Monitor Controller Company's electric motor controls, The Reliance Electric & Engineering Company's motors and generators and the Union Chain & Manufacturing Company's chains and sprockets.

• • •

A. R. McTEE of THE OIL WEEKLY gave an account of his visit to the United States Navy's Petroleum Reserve 3, Point Barrow area, Alaska, and presented motion pictures in color, filmed by the Navy, of the development and exploration operations on the project before the Houston Geological Society February 8. The Houston Geological Society had as guest speaker February 11 **HAROLD HENSLEY,** Humble Oil & Refining Company, who discussed the engineering problems and cycling operations in the Katy Field, Waller County, Texas.

• • •

FRANK CROW has been appointed chief engineer for Murray Rubber Company, Houston. He was formerly a member of the engineering staff of Cameron Iron Works. **LYNNE MURRAY, JR.,** and **EDWARD MURRAY,** who left positions with the company to enter the Army, have returned to their jobs. Lynn will direct the sales promotion department, and Edward is plant manager.

Frank Crow

Edward Murray

Lynne Murray, Jr.

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Yes, we have it—or will try to get it for you—at the time you need it. Everything—from the largest Wilson Rotary Drilling Rigs down to the smallest Production Valve. Our service is geared to the tempo of the Oil field . . . and done in a friendly manner which makes you want to do business with us. Industrial stores and branch offices are conveniently located throughout the Texas and Oklahoma oil fields. May we be of service to you . . . NOW?

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AT YOUR SERVICE AT ALL TIMES

MEN IN THE INDUSTRY NEWS

E. W. FARROW, general sales manager for Harvey Machine Company during the war years, has been named manager of the oil equipment division. His activity in the oil equipment field goes back to 1919 and includes work with the Union Oil Company, Byron Jackson and 11 years as vice president and general sales manager of Security Engineering Company, Inc. While with E. B. Wiggins Oil Tool Company, he invented the Wiggins Reamer, and has invented and patented several oil field tools on his own account.

E. W. Farrow

• • •

FRANK D. NEWBURY, who started with the Westinghouse Electric Corporation in 1901 as an apprentice engineer and rose to a vice presidency, has been elected a member of the board of directors. During the war Newbury headed the company's emergency products division. He also coordinated the work of three ordnance plants which Westinghouse operated for the Navy.

• • •

C. O. WILLSON, editor of *The Oil & Gas Journal*, spoke before the East Texas Chapter of API, at Kilgore February 19 on "Engineering Trends and Oil Developments in The Middle East." A sound film, "More Power to You," was presented through the courtesy of Buda Engine and Equipment Company.

• • •

R. H. McPEAKE, former export sales manager of the Oil Well Supply Company, is in Buenos Aires as manager of the new Petroleum Division of Sociedad Argentine Tecnica Industrial y Comercial, which will represent his firm in Argentina. He was discharged from the Navy in November as a lieutenant commander.

J. ROBERT KELLY has been appointed executive vice president of Manning, Maxwell & Moore, New York City. He joined the company in 1930 as general manager of the mill supply division and in 1933 was sent to Central America in the interest of the export department. In 1938 he became a vice president of the concern and went to Brazil on a special mission, and in 1942 he became assistant to the president.

• • •

A. J. KERR, formerly general sales manager, has been elected vice president of sales for Rockwell Manufacturing Company. He has been associated with the company for more than 20 years, beginning his career as district manager of the Pittsburgh Equitable Meter and Nordstrom Valve companies, now divisions of the Rockwell firm, and was made general sales manager in 1944.

• • •

J. C. BARKLOW, with Lane-Wells Company at Oklahoma City, has been assigned to Dallas, where he will have charge of his company's operations.

• • •

ROBERT VINCENT has been discharged from the U. S. Army and has joined the scouting division of Stanolind Oil and Gas Company at Tulsa.

• • •

STUART F. HEINRITZ, editor of *Purchasing* New York City, spoke before the Purchasing Agents Association of Tulsa, on "The Buyer Looks at Business."

• • •

J. E. NOLEN, JR., has joined the Engineering-Sales Department of Henry H. Paris, distributing organization of Houston, after five years in the armed service. Prior to entering the service he was connected with the sales department of Hughes Tool Company.

• • •

JOHN L. PEEBLES, president and general manager of Peden Iron and Steel Company, Houston, has been appointed chairman of the domestic trade committee of the Houston Chamber of Commerce.

Deaths

GEORGE D. FOSTER, 58, director and secretary of the Devonian Oil Company, Tulsa, died Febraury 13, in El Paso while on a business trip. Foster was born in Missouri and moved with his parents to Caddo County, Oklahoma. After attending public schools he worked in the Binger bank and in 1908 moved to Tulsa where he became a stenographer to the late "Uncle Joe" Evans, for many years general manager of the Devonian Oil Company and before his death its president. Foster headed the land department for many years. He participated in some of the most important oil booms in Oklahoma as well as in Texas and Kansas. He was a director of the Independent Petroleum Association of America.

George D. Foster

• • •

COLONEL E. WALTERS, famous auctioneer of oil leases on Osage Indian lands in Oklahoma died February 15 in Skedee, Okla. Walters conducted many of the earlier sales in the Osage when oil men bid hundreds of thousands of dollars for tracts. He conducted the auction at which a 160-acre lease was sold to Midland Oil Company, a subsidiary of the Empire companies, for $1,990,000, highest price ever paid for the right to drill a well on a 160-acre tract in the Osage. He was honored by the Osage tribe which made him a member of their nation and presented him with a U. S. deputy marshal's badge with a large diamond in the center. Walters, 79, was born in the Fort Gibson area of old Indian Territory. In 1937 he was selected as the official auctioneer by the University of Texas to conduct sales of its West Texas oil lands.

BRUCE RUSH, 97-year-old retired oil producer, died February 18 in Tulsa. He was a native of Orsina, Penn., and went to Tulsa 40 years ago from Marietta, O.

• • •

JOHN H. TOMLINSON, 54, oil operator and son of a pioneer oil man, died February 17, in Tulsa. Born at Centerville, S. D., he went to Tulsa 25 years ago and had been associated with his father in the drilling contracting business. He was active in the Seminole oil pool development and in other drilling enterprises.

• • •

CRAIG T. GARDNER, Dallas drilling contractor and producer, died February 18 after a brief illness. He was a native of Beaumont and worked for Gulf Oil Corporation about 20 years. He resigned as a superintendent in the late 1920's to form a partnership with his brother **J. ALVIN GARDNER** of Dallas.

• • •

I. J. KILLOUGH, 77, former Texas oil and gas supervisor in charge of the Eastland office, died in Eastland February 18.

• • •

ARTHUR J. CRIST, 55, Oklahoma independent oil operator, died February 14 in Tulsa. He had been active in Oklahoma and Kansas areas about 20 years.

• • •

JAMES F. ENRIGHT, 52, drilling contractor from Madison, Kan., died in a Wichita hospital February 18. He was active for 28 years as a drilling contractor in Kansas, Oklahoma, and Texas.

• • •

C. L. (MONK) PARKER, 44, employe of the land department of Stanolind Oil & Gas Company, died in Jackson, Miss.

ZUBLIN DIFFERENTIAL BITS

Where drilling speeds are essential the Differential Bit affords speedy, safe drilling with plenty of cutting action at bottom of hole. Bulletins and prices upon request.

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- Water Treating Plants
- Core Analysis
- Estimate of Results
- Valuations
- Supervision

PETROLEUM ENGINEERS
CABLE & STINE
WICHITA FALLS, TEXAS

International Harvester Makes Management Personnel Changes

International Harvester Company has announced the following changes in branches and in branch management personnel:

Separate motor truck branches have been established at San Antonio and Houston to handle motor truck sales, parts and service exclusively. Management personnel has been selected from the staffs of the respective general line branches, which will continue in operation without other change.

T. R. Moulder, formerly assitsant manager in charge of motor trucks, has been named manager of the new San Antonio motor truck branch. C. T. Helin has been similarly advanced from assistant manager in charge of motor trucks to manager of the new motor truck branch at Houston. E. M. Moore, who has been retail motor truck manager, has been appointed assistant manager of the Houston motor truck branch.

Other recent branch management changes announced by International Harvester are as follows:

M. J. Gowen, previously assistant manager at the Cincinnati motor truck branch, has been made manager of the Richmond, Va., motor truck branch. L. C. Carroll replaces Gowen as assistant manager at Cincinnati. He has until recently been retail motor truck manager at the Columbus, O., branch. C. V. Ellis, who has been assistant manager of the Topeka branch, has been transferred to the Kansas City motor truck branch in the same capacity.

Dresser Executives at Annual Conference

More than 100 executives, salesmen and engineers of eight of the 14 member companies of Dresser Industries, Inc., met in their annual sales and engineering conference in Mineral Wells recently. Pictured are some of the executives present.

Back row, left to right: J. C. McEwen, vice president; H. L. Putnam, vice president; R. R. Bloss, vice president; G. W. Walton, vice president; L. R. Wells, vice president. Front row: J. M. Aitken, assistant general manager; C. M. Powell, Mid-Continent regional manager; O. M. Havekotte, president; Ferguson Barnes; vice president; C. R. Athy, manager, sales promotion.

Model No. 17-S

First Choice Among Oilmen Everywhere Is This Safety-Approved Justrite Flashlight

Best seller in the petroleum industry is this 3-cell Justrite flashlight Model No. 17-S. Powerful beam of 1800 candlepower; 3 cells assure dependable light. Can be used for either spot beam or spread light. Strongly molded plastic case, guaranteed against breakage. Signal flasher switch. Fits in palm of hand, stands on base, or attaches to belt with belt clip. Approved by Underwriters' Laboratories, Inc., and by U. S. Bureau of Mines.

Uses New Honeycomb Lens

Where a larger beam of light is desired, use the famous new Justrite Honeycomb lens—it fits any Justrite Service Flashlight. The Justrite Honeycomb Lens spreads a circle of clear, even light (3 ft. in diameter at 8-foot distance). No dark rings, no distortions.

Honeycomb Lens

Available now! Ask your supply company about Justrite.

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Earle M. Jorgensen Adding Two Warehouses at Houston

Earle M. Jorgensen Company, steel distributors, are adding to the Houston facilities by building two warehouses. Each building will be 80 feet wide by 280 feet long. Present office space is being increased three times the present amount, also.

Equipment for the new warehouses and additional equipment for the present facilities which are also being extensively improved, will include two 5-ton overhead cranes and a 24-inch capacity friction saw for cutting structural shapes. Burning equipment will consist of 70 feet of burning tables, two 150-pound generators for generating acetylene gas and a Cascade unit for oxygen, one 4-torch and one two-torch shape cutting machine for cutting circles, rings, sketches, etc. In addition, two portable cutting machines for straight line cutting will be used. All torches will be equipped to cut plate up to 10 inches thick with special attachments available for heavier sections. Additional delivery equipment will include a three-ton truck and trailer with a 30-foot bed.

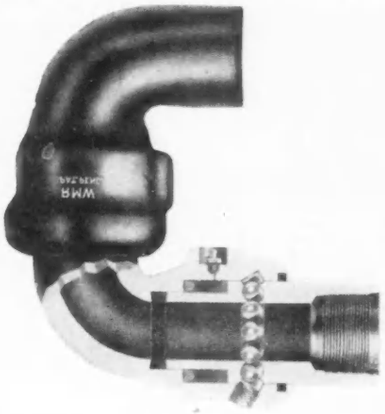
The expansion will give the company about 91,600 square feet of warehousing facilities in Houston. Larger stocks will be carried and will include carbon, alloy, stainless, tool and specialty steels in the form of bars, billets, plates, sheets, strip and structurals.

Bethlehem Store Opened

Bethlehem Supply Company's first new store for 1946 was opened at El Dorado, Kan., on February 1. F. W. Jensen will be store manager and field representative. R. A. Johnson is Kansas district manager for the firm and has his office in the Union National Bank Building, Wichita.

1—Swivel Joint

Roofe Machine Works has developed a swivel joint of the high pressure type to take care of the increased pressures in deep well drilling. Simplicity of design is a feature of the joint and no



special tools are needed for replacement of parts.

The joint rotates easily by hand at 7500 pounds working pressure and rotates 360 degrees. High temperature, high pressure, neoprene chevron packing is used.

Roller bearings are flat with the outside end slightly oval for clearance in the races. Specially designed junk rings allow the lubricant to automatically lift the lips of the packing the instant pressure is applied and minimizes the possibility of leakage.

Neoprene gasket between parts serves to resist abrasion caused from turbulence of fluid, drilling mud or cement passing through the joint.

Production is of the 2-inch size only but larger and smaller sizes will be manufactured as soon as materials and equipment are available.

These joints have withstood all laboratory tests and the bearing area is long enough to assure perfect alignment of all working parts under the severest working conditions.

(Check item 1 on coupon for more information.)

2—Tractor

Industrial Power Division, International Harvester Company, has introduced a diesel crawler tractor in the 130 drawbar horsepower range. The tractor, TD-24, weighs approximately 35,000 pounds.

Features of the tractor include a new type of steering, giving the operator easy and positive control of the tractor; use of special sealing and anti-friction bearings in track rollers, greatly extending the track roller lubrication period; and convenient mounting for all types of allied equipment. The TD-24 is functionally streamlined, giving the operator a clear view of mounted equipment and the work in all directions. Additional contributions to driver comfort are the wide seat and convenient controls.

The TD-24 is designed with a horsepower-to-weight balance which ensures a high percentage of engine horsepower delivered at the drawbar. Eight speeds, from 1.6 to 7.8 miles per hour, give the tractor great flexibility on all jobs.

A new International six-cylinder, full-diesel engine powers the TD-24. This engine will have the International built-in gasoline starting system which, with an electric starter, assures easy starting in all weather conditions. The TD-24 engine also has many excellent features which are standard on current International diesels, such as replaceable hardened cylinder sleeves, full pressure lubrication, Tocco hardened crankshaft, large diameter precision main and connecting rod bearings.

(Check item 2 on coupon for more information.)

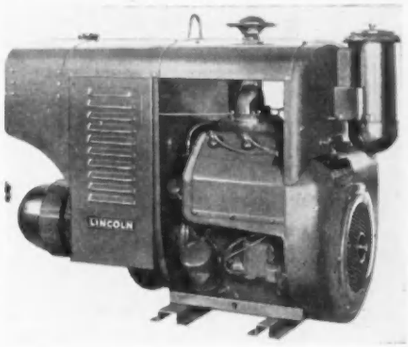
3—Portable Welder

The Lincoln Electric Company has introduced a portable welder of the gasoline engine-driven type, designed to bring to the welding industry an inexpensive, complete, light-weight, portable outfit. It is said to be particularly valuable for welding applications in areas where electric power is not readily available, such as isolated locations in oil or gas fields.

The welder is of compact design, measuring 24 x 48 x 30 inches.

With a current range of from 40 to 250 amperes, the machine can be used for the welding of light or heavy gauge metal, for the repair of cast iron structures such as engine blocks, for the construction of various contrivances or the repair or fabrication of tools and machinery parts, and for hard facing of worn parts.

Provision is made on the output panel for three ranges of output current, continuous adjustment within these ranges



being obtained by means of a simple speed control.

Generator controls are mounted inside an enclosed cabinet above the generator, cooling being through a fan mounted on the generator shaft.

The welder is powered by a Wisconsin air cooled, four-cylinder, V-type engine. Shrouds around the engine fan and cylinders direct the cooling air. The speed of the engine determines the welding current which is controlled by adjusting the engine speed between a maximum of 2100 revolutions per minute (22 horsepower) and 1500 revolutions per minute (16 horsepower).

(Check item 3 on coupon for more information.)

4—Motor Protection

Fire Extinguisher Division, General Detroit Corporation, announces development of a product, Wetstart, which is said to eliminate automotive troubles caused by moisture. The material is designed to make ignition systems waterproof, to restore and protect insulation on wiring, to retard battery corrosion, and is said to give from six months to two years protection with a single application.

(Check item 4 on coupon for more information.)

Use This Convenient COUPON for Additional Information

Check below the numbers identifying items on which you want additional information. Mail coupon to The Oil Weekly and your request will be forwarded to the manufacturer.

THE OIL WEEKLY
P. O. Box 2608, Houston 1, Texas, U.S.A.

Please have manufacturers send me, without obligation, more information on items shown in February 25 issue of The OIL WEEKLY as checked below:

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

In addition to information checked above, I would like more data on products or services advertised elsewhere in this issue by_____ Company

Name_____ Title_____

Company_____

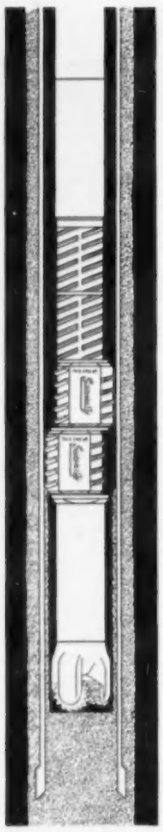
Address or P. O. Box_____

City_____ State_____

(To avoid delay PRINT or TYPE clearly name, company and mailing address)

5—Casing Scraper

Security Engineering Company has perfected the Security casing scraper for cleaning out casing. Shearing action of the scraper enables it to thoroughly remove obstructions and foreign matter from within casing walls, assuring a free, downward passage of tools and equipment.



Simplicity of design features the scraper. Four reversible cutters having rectangular openings through the center are mounted on a square mandrel. These are expanded against casing walls by strong coil springs which fit into each cutter and exert pressure between the cutter and mandrel. Cutter teeth bear firmly against the casing walls and insure full gauge contact at every point. Cutters are separated by spacers so constructed that circulation readily by-passes the cutters, but debris is prevented from entering the spring recesses. The multiple cutter teeth contacting the casing throughout their length make certain that every inch of casing is thoroughly cleaned.

Cutters are equipped with two complete sets of teeth 180 degrees removed on the cutter body. Since the cutters do not rotate on the square mandrel, only one side of each cutter contacts the casing at any one time. After considerable use, the cutters can be reversed to utilize the opposite cutting teeth, thus renewing sharpness and restoring original operating efficiency.

During rotation the helical cutting teeth shear all protrusions. Gun perforations, for example, are not burred over but retain their full opening. The cutters are expanded to the full inside diameter of the casing by positive spring pressure and contact approximately 360 degrees of the casing circumference at all times. The multiple spiral teeth cannot pass obstructions without indicating their presence to the operator.

(Check item 5 on coupon for more information.)

6—Pumping Control

Westinghouse Electric Corporation has developed a new a-c magnetic oil field pumping control which combines circuit protection and motor control in a single unit to save space and wiring. The unit is especially designed to provide for the automatic starting and stopping of oil field pumping motors. Weather-proof enclosure permits outdoor, pole mounting close to the load. The dead front inner door protects the operator from live parts when cabinet door is opened.

The starters are available in two basic types, each providing overload and low voltage protection. The automatic unit includes AB breaker, "De-ion" linestarter, lightning arrester, hand reset low voltage relay, "Hand-Off-Automatic" selector switch to permit manual operation, socket and time switch. The time switch automatically controls specific pumping periods during the day. The local control unit includes AB breaker, "De-ion" linestarter, lightning arrester, and Start-Stop pushbutton. Ratings are from 1 to 25 hp, 110, 220, 440-600 volts.

(Check item 6 on coupon for more information.)

Use the Coupon

For free copies of Manufacturers' Literature or more information on products described on these pages, use the convenient mailing coupon on page 77.

Literature

7—Controller

Taylor Instrument Companies have issued a bulletin describing the purpose, construction and operation of the Taylor Level-Buoy indicating controller. Features include pointer indication of level which is entirely mechanical and independent of controller air supply.

(Check item 7 on coupon for more information.)

8—Heaters

The Swartwout Company has published Bulletin S-18-E which describes and illustrates deaerating and standard feedwater heaters for power plants. These heaters can be tailored to fit the job and come in many sizes.

(Check item 8 on coupon for more information.)

9—Pumps

Oil Well Supply Company has released three new bulletins. Bulletin U14-1145 contains illustrations and engineering features of the TC-5HB and TC-8B twin crank pumping units. Bulletin B10-1045 describes the 1525 welded boiler and lists the special features of the equipment. Engineering data and size ranges of Oil Well's 612-P power slush pump (6 x 12) is contained in Bulletin P19-1245.

(Check item 9 on coupon for more information.)

10—Speed Control Devices

Reeves Pulley Company has issued a booklet describing developments in speed control devices. Information presented in the booklet is based on more than half a century of progress in speed control engineering and design.

(Check item 10 on coupon for more information.)

Increase Your Production . . .

by cleaning your liners and screens **in the well**—creating new channels in the formation and heat-treating the old ones—by the revolutionary new "Patten Process" of Chemical Expansion. Tests show increased production of two and a half to fifteen times pre-treatment recovery.

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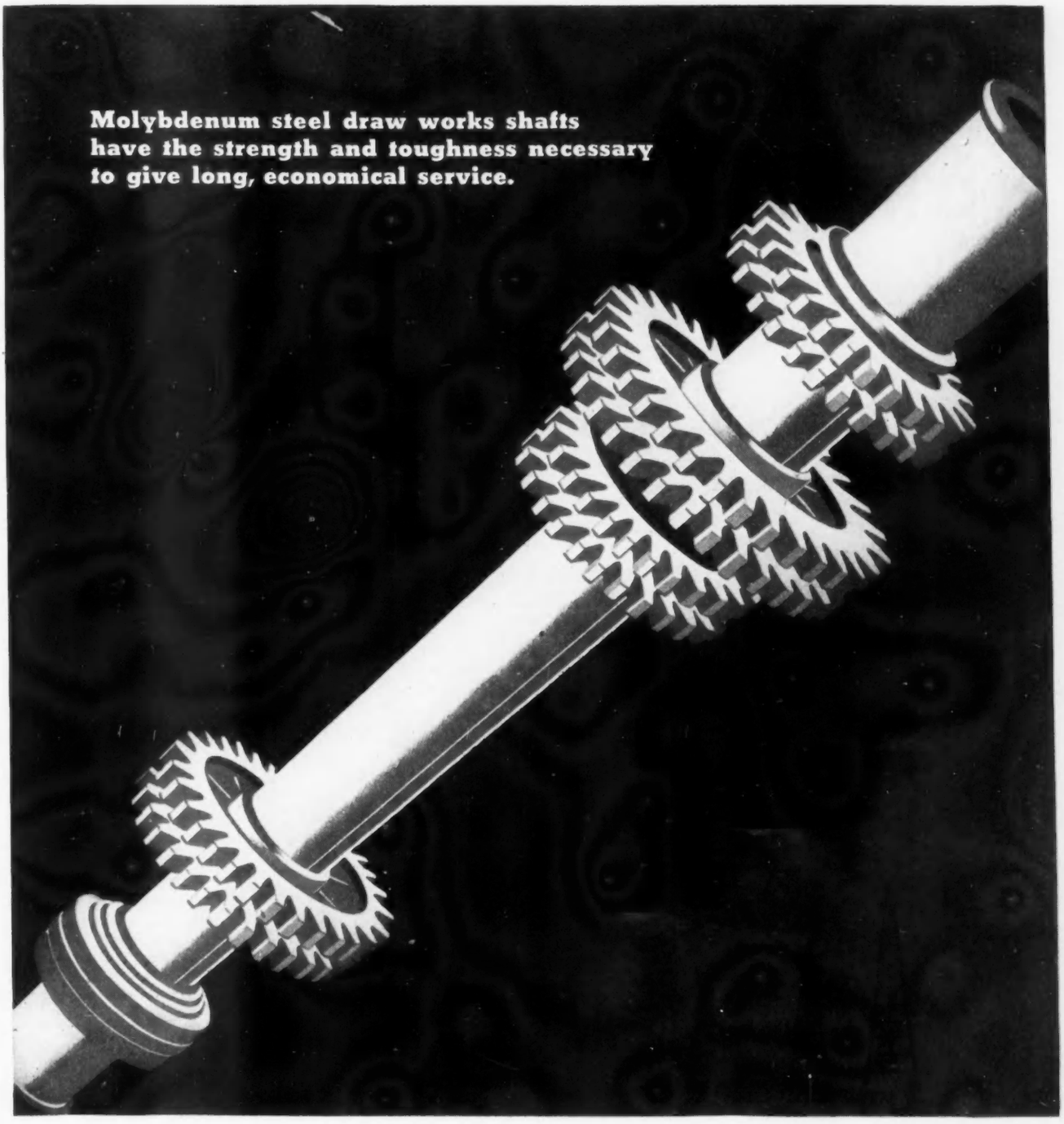

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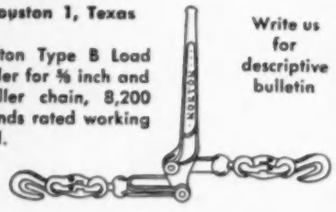
Norton Type B Load Binder for ⅝ inch and smaller chain, 8,200 pounds rated working load.



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Write, giving outline of education and practical experience, as well as salary expectations. Letters received will be treated confidentially.

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c/o The Oil Weekly, Houston, Texas.

Oil Men Named Officials of Tulsa Chamber of Commerce

Eight Tulsa oil men have been named to the executive committee of the Tulsa Chamber of Commerce oil activities department. Ralph O. Dietler, Stanolind Crude Oil Purchasing Company, heads the department, and George R. Kinter, Tide Water Associated Oil Company, is vice chairman.

Members of the executive committee are chairmen and vice chairmen of subcommittees. They are David L. Trax, Gulf Oil Corporation; Charles G. McLaren, Shell Oil Company; E. B. Reeser, Barnsdall Oil Company; P. H. Bohart, Gulf Oil Corporation; G. A. Tompson, Bethlehem Supply Company; and W. M. Bovaird, Bovaird Supply Company.

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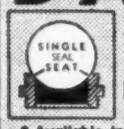

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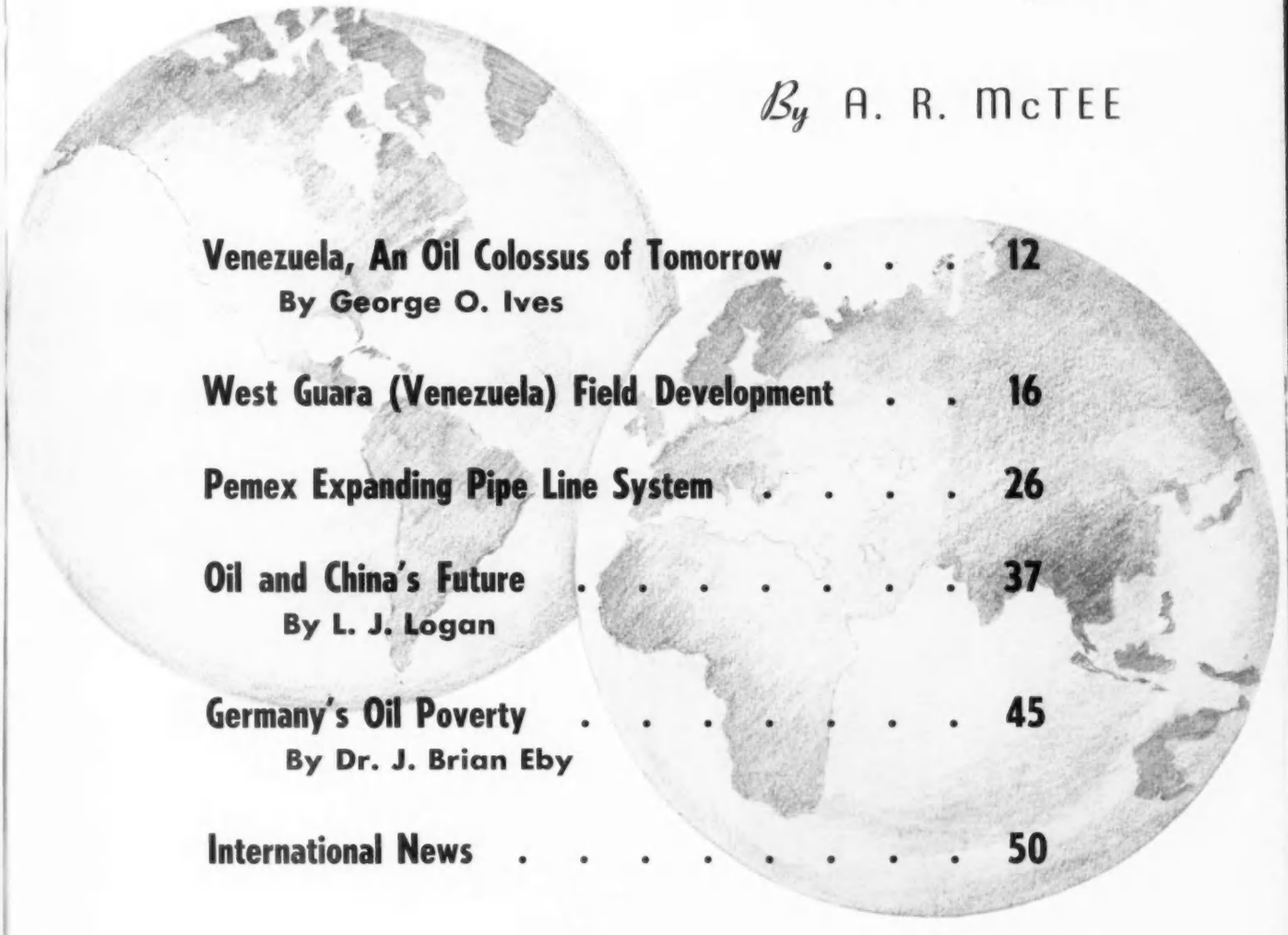

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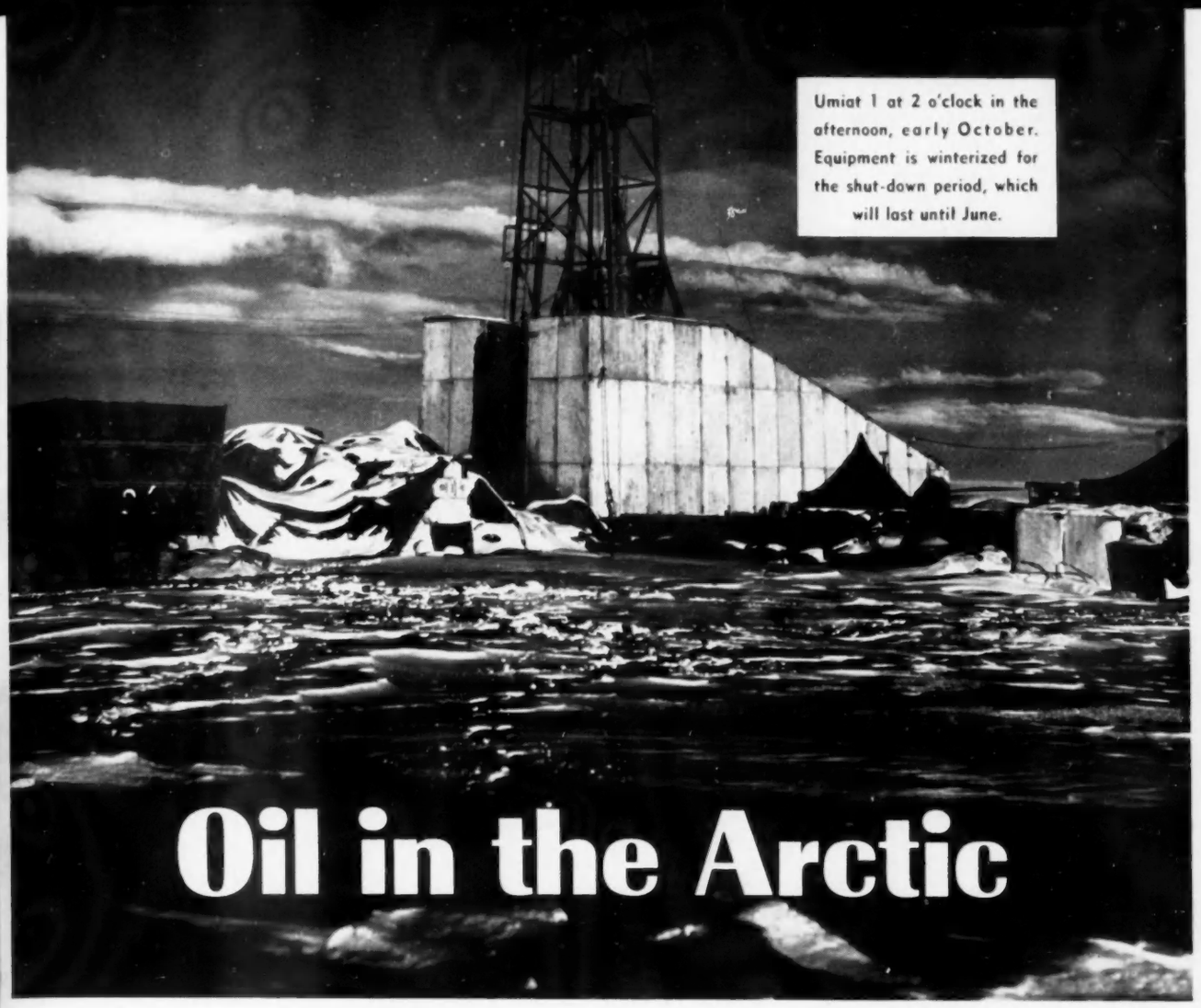


Umiat 1 at 2 o'clock in the afternoon, early October. Equipment is winterized for the shut-down period, which will last until June.

Oil in the Arctic

Seabees win first phase of their struggle to wrest oil from the frozen northland

By A. R. McTEE, Staff Writer

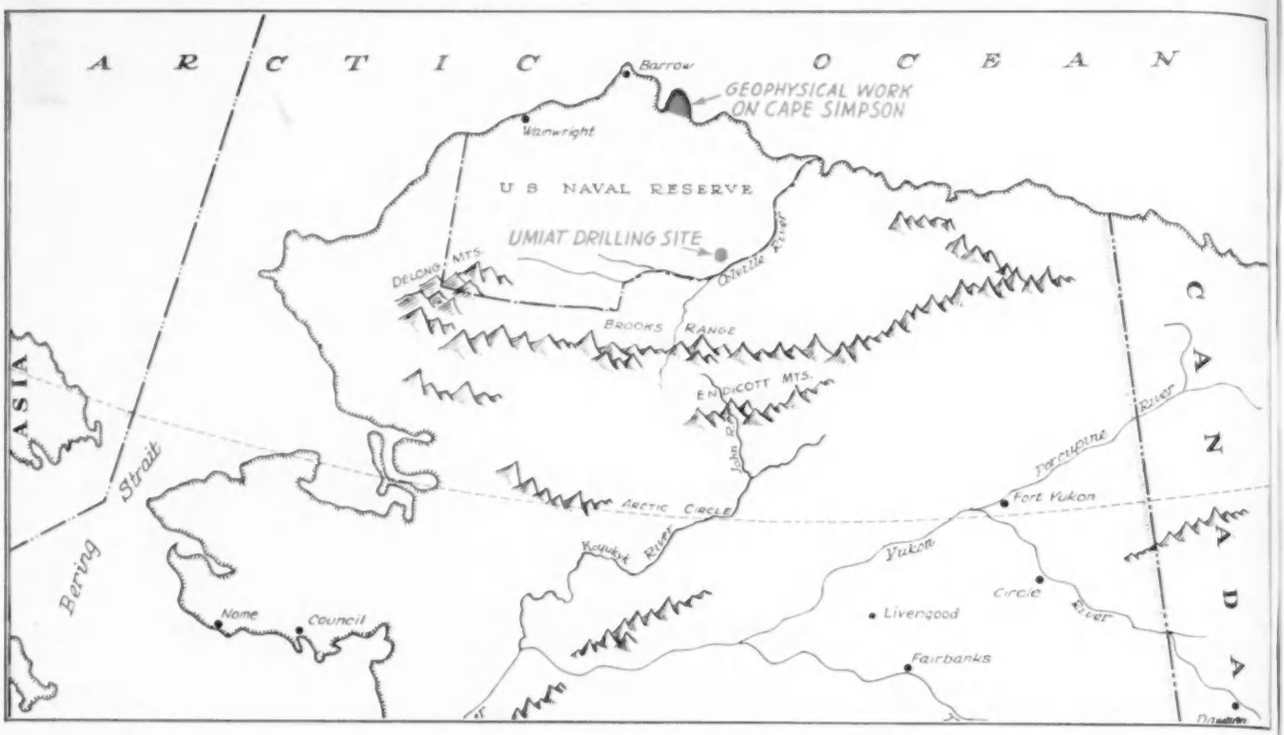
WITH the successful ending of the first phase of exploratory drilling on United States Navy Petroleum Reserve 4, at Umiat, Alaska, the project takes on added interest.

In an area that has given some promise of oil for more than 50 years, tempting geologists by its phenomenal oil seeps, but which is indescribably forbidding and antagonistic to the white man for at least nine months of the year because of the incredible cold, a test well has been drilled to 1816 feet without any serious mishaps and in spite of problems not heretofore met in oil prospecting. Four separate sands were encountered, each showing enough oil to encourage further drilling. Material and equipment are on hand at the well site or at Camp Barrow, the supply base, to resume operations next spring as soon as the season permits and to continue the well to 7000 feet. From experience gained in sinking the test to its present depth, it is felt by those in charge of the operation that the work will gradually become routine in character, and can proceed more quickly next year.

Authorized in 1943

Also because every detail of the venture has been experimental from the beginning, many of the questions that loomed large at the time the work was undertaken have been or can now be answered, and that fact is established that exploration for oil can be carried on in the Arctic.

Umiat had its beginning when the late President Roosevelt gave authority for testing the Reserve in 1943. Then a special appropriation from Congress provided funds solely for the purpose of exploring the area which had been set aside by President Harding in 1923 as an oil reserve. The project aims to determine whether oil is present in quantity in the reserve. Under President Roosevelt's order, the work was to be done by the Navy. Vice Admiral Ben Moreell, CEC, USN, Chief of the Bureau of Yards and Docks, was placed in charge. The work was requested by Rear Admiral Harry B. Stuart, USN, since retired, but then Director of Naval Petroleum Reserves. Admiral Stuart's successor, Captain William G. Greenman, USN, is giving the venture his support, and the work has been done by specially



Flying North to Umiat

Material for the accompanying article by A. R. McTee, staff writer for *The Oil Weekly*, was gathered first hand on a recent trip of approximately 11,000 miles covering the Aleutian Island Chain, and a major portion of Alaska including Point Barrow at the northwesternmost tip of the North American Continent. The trip was made by air under the auspices of the United States Naval Air Transport Service. It originated at Naval Air Transport Headquarters, Oakland, California on November 4.

Stops were made at the following points: Seattle, Washington; Kodiak, Alaska; Adak, Aleutian Islands; Attu, Aleutian Islands; Fairbanks, Point Barrow, Anchorage, Juneau and Annette, Alaska. The flight started November 4 and was concluded November 14. Lt. Com. Walker J. McFarlan, Washington, D. C., and Lt. (jg) Marvin Miles of Oakland, California, were in active charge of the trip. Guests included 14 representatives of daily newspapers in the United States, and two representatives of oil journals. In subsequent articles, McTee will discuss aviation in connection with the drilling at Umiat 1, the proposal which is to be made to Congress by the Navy as to further activity on Reserve 4, the pipe line survey that has been made from the well site to Fairbanks, Alaska, and a probable article on the strategic importance of an oil reserve in the far north.

selected members of the Seabees, commanded at present by Captain Paul D. Davis, USN, formerly an oil operator of Arkansas.

Under the authority controlling the operation, the project cannot extend beyond the oil-finding stage. As the law now stands only a national emergency can bring this Alaskan oil property under complete development by the Navy.

Vice Admiral Moreell ordered the Seabees expedition to Point Barrow on June 2, 1944, and placed Captain Bart W. Gillespie, CEC, USNR, of San Gabriel, California, in charge to organize it. The expedition had to get itself established on the reserve within the six weeks of "open season," involving split-hair timing, and fast work. Through the Bureau of Yards and Docks procurement machinery, enough cargo was provided to fill one World War I Hog Islander and one Liberty ship, at a West Coast port.

At the embarkation point, oil drilling equipment had been assembled from Texas and California, and when the two ships set out for Point Barrow, they carried 8200 long tons of freight, about eight times the weight of the standard polar expedition. Approximately 200 Seabees made up the personnel. With Navy PBYs flying ahead as look-outs for dangerous ice floes, the two-ship "Armada" moved into the Bering Sea, and reached Point Barrow in time to establish Camp Barrow, about two miles away, during the summer of 1944. Amphibious landings were made at carefully selected points off Point Barrow and Cape Simpson, beyond Barrow, with violent Arctic ice as the enemy. At this time there were no docks or ramps. The ships had to be anchored about three miles off shore, in shifting ice, and LCMs and pontoon barges took men and equipment ashore.

During the short summer season when the ice melts, the Arctic coast in the region of Point Barrow becomes a bed of loose gravel to a depth of about 12 inches, with gravel ranging in size from peas to small marbles, making even walking through it almost impossible. No wheeled vehicle can be used, and only tractor-type machines can get across the beach. Moving the contents of the ships onto the beach is a saga of achievement itself, but the supplies were put ashore in due time, and the expedition made ready to go into its first winter of seculsion on the ice and fog bound Arctic beach, at the camp now known as Barrow. An airstrip was begun immediately to provide communication with the outside world before September brought an ice-locked Arctic. A camp was established, mostly of Quonset huts to house the men, and a warehouse was built to protect machinery against the extreme temperatures.

Rig Set

During the winter as weather permitted, the rig was set up near Barrow and a test hole drilled to 600 feet, solely to work out as many "bugs" as possible before moving to the site of Umiat 1. This was done while it was impossible to get to the location and proved a valuable time-saver later on. In fact, without this experimental laboratory, it is doubtful whether as much could have been accomplished last summer.

At this point a word about Arctic weather is in order to appreciate fully just what was achieved in the first few months by the expedition. The average mean temperature at Point Barrow is about 30 degrees below zero during the winter months, and the place is only 1100 miles from the North Pole. This does not mean, however, that such cold prevails all the time. When the writer visited Camp Barrow on Friday, November 9, the thermometer stood

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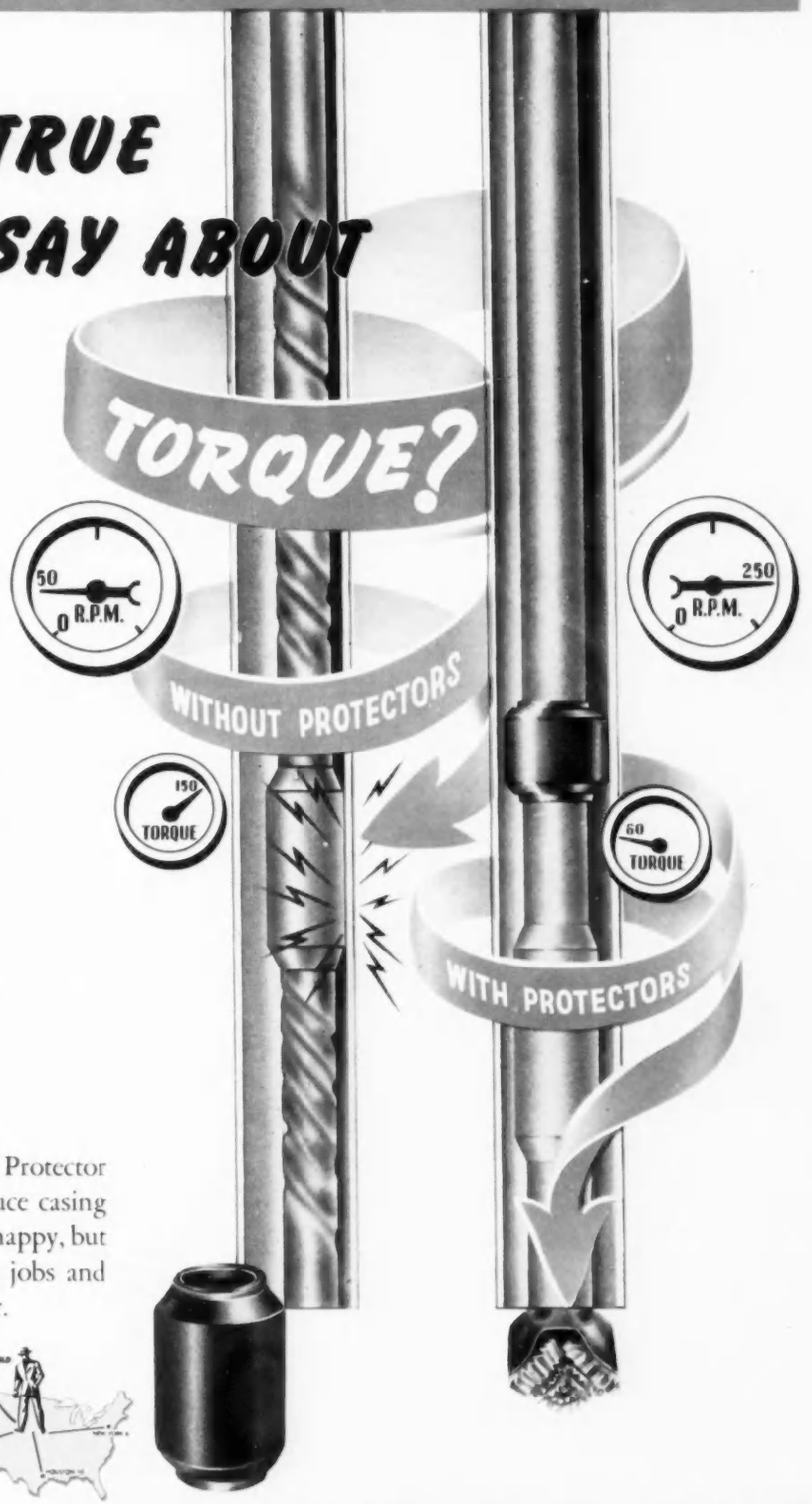
IS IT TRUE WHAT THEY SAY ABOUT



CASE HISTORY No. 2

A prominent drilling contractor in one of the "hard to drill" areas of the gulf coast was having trouble getting any drilling speed. He was drilling inside 7,000 feet of 9⅝" casing, with 4½" drill pipe. He was unable to get above 50 R.P.M. without the torque indicator reading going over 140 points, which he considered his safe limit to avoid a twist-off with his drill pipe.

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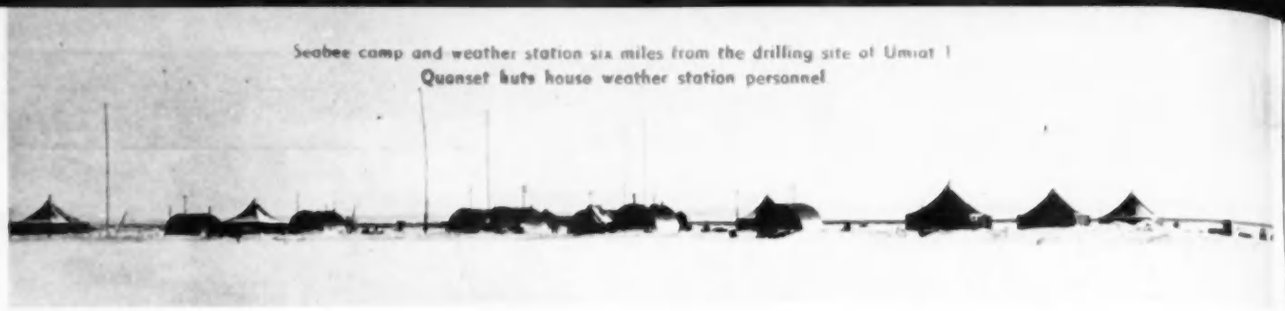

Seabee camp and weather station six miles from the drilling site of Umiat I
Quonset huts house weather station personnel

at approximately 13 degrees below. The day was clear and there was a slight wind. There was much activity at the camp, with men and machines apparently going about their business as usual. Everybody wore parkas when outside and we were cautioned about exposing our hands. Outside of a few smarting eyes and one eye that couldn't be closed for a few minutes because a teardrop froze in the corner of it, the party experienced no pronounced discomfort. But there are many days, even weeks, when temperatures of 20 or 30 and sometimes 40 degrees below persist. In such weather any outside work is well nigh impossible. In terms of effect upon a human being, a temperature of 20 or 25 degrees below zero will freeze a man's hand stiff if it is just waved through the air once, unprotected, it is said. Many frozen toes, fingers, noses and ears, are experienced at Barrow, but they are the exception rather than the rule, and every possible precaution is taken to protect the men from the cold. And contrary to what one might believe, the health situation has been good. Colds are not general, and few of the men have been sick. On the whole, the climate is invigorating, and when properly clothed and fed, white men in the Arctic can keep their health.

The site for the first test well on Reserve 4 had previously been determined, and had been named Umiat. It is located on the Colville River, in the southeast corner of the Reserve, 180 air miles from Point Barrow, on the Arctic plain, at one of the most desolate points in an isolated region totally devoid of inhabitants. Only an occasional Eskimo ever ventured to the area before geologists began scouting in the territory, and now except for members of the crew connected with the well, the country is left to the caribou and the Arctic fox.

Race for Time

From Camp Barrow to Umiat, the expedition's detachment had to make its way with its ponderous equipment. The race for time was on also. The project had to be started during the short summer season, and that meant actually about 2½ months at the best, with a possible two weeks grace of doubtful weather. So to get the equipment on the ground, ready for operation at the earliest possible date, the first cat train left Barrow in the latter part of January, 1945, headed for Umiat. With bulldozers for locomotives, trains of tractor sleds, especially winterized "go devils" which are a species of mechanized dog-sled, snow-jeeps, three wanigans, a type of wooden hut for housing the crew en route, and other ingeniously heated equipment, this ice-caravan, carrying 120,000 tons of equipment and supplies, moved toward Umiat. The 180 air miles stretched into 331 trek-miles, over a practically uncharted route, down Elsen Lagoon, Admiralty Bay, up the Chipp River and Ikpikpuk River, then down the Colville to the destination. This first trip was made in 25 days, 18 out and seven back. Since then two other trips have been made to Umiat, and time for the round trip has been cut about in half, due to communication aids which were established at Barrow and at Umiat. After the first trip a weather station was set up at Umiat, which greatly aided progress on the second and third trips.

The drive to Umiat was preceded by various ice tests and an 80-mile expedition to Cape Simpson, east of Barrow, to guarantee as far as possible the longer and more arduous Umiat expedition. Strains on the ice had been measured by the heaviest runway construction equipment being moved over bays and lagoons, and all this preparation paid off on the Umiat trip. Weather of 50 degrees below was encountered and the group of 20 men and two officers was marooned for a time in a blizzard. The climatic hardships endured is said to equal anything recorded in the books of the world's explorers. In spite of it all, however, no damage beyond the turning over of one sled was experienced, and no equipment was lost or abandoned.

Safety Measures

Meticulous preparation in Washington, D. C., at Chicago, and careful supervision at Point Barrow accounted for the extraordinary safety, as did exceptional aids that were planned for the success of the expedition. These included the Arctic bush-pilots, under contract to the Navy, who served as scouts. Safety was further provided by the constant radio communication between the expedition, even en route, and the newly established Arctic radio stations. Thus the ground expedition, which included a radio equipment and operator, was always within talking communication with its plane scouts overhead, with Point Barrow and with Cape Simpson which had weather stations, on the first trip, and later with its outermost settlement at Umiat, on the second and third. Sometimes planes landed on runways hastily scooped out by the bulldozers. It was this coordination between weather stations, scouting planes in the air, and the cat train as it moved toward Umiat, that

Complete cat train with supplies on the way from Barrow to Umiat I

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2-way Blade. Note locating hole.
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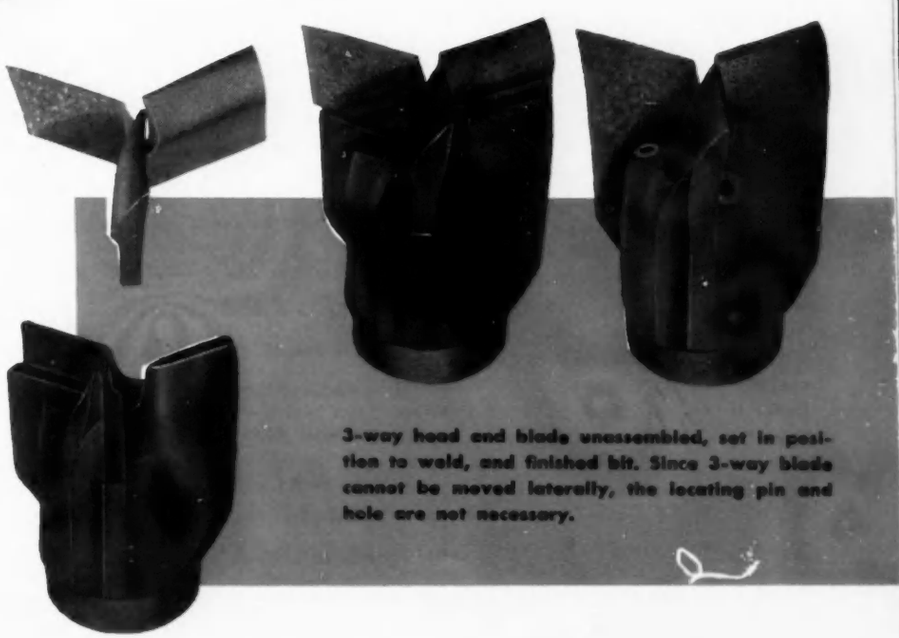

3-way head and blade unassembled, set in position to weld, and finished bit. Since 3-way blade cannot be moved laterally, the locating pin and hole are not necessary.

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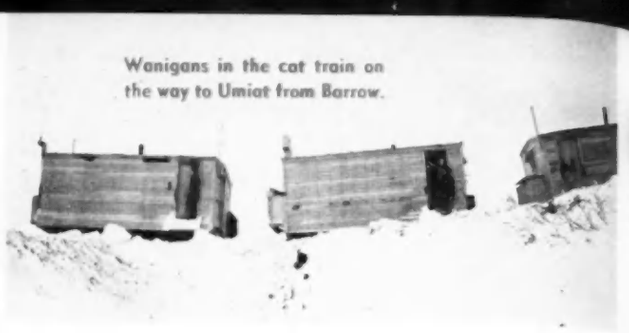
Weasel with a load of supplies at Umiat 1.



Wanigans in the cat train on the way to Umiat from Barrow.

much time was saved even on the first trip, and that has greatly reduced the time on subsequent trips. Planes can now make the trip from Barrow to Umiat and fly on a beam, and can take off and land in darkness both at Barrow and at Umiat.

Planes Help

Unquestionably the project could never have reached its present stage without the help of aviation, and further testing and development of the Reserve depends in large measure upon the use of aerial transportation of men and equipment. Today at Point Barrow there is every known aid to aerial operation and a plane can land there as easily as at any of the Army or Navy bases in Alaska. During the period when the Seabees were establishing the base at Barrow, they were assisted in building up radio aids to navigation by the Alaska Communications System and the Army Air Communication Service. Since then the Naval Air Transport Service has taken over air-flights and is now handling all cargo movement into the Reserve, and had transported more than 2 million pounds of equipment and supplies to the camp at Umiat and the well site. Last summer landings were made on a sand bar in the river near the camp, but there is now a long air strip six miles from Umiat equipped with steel mats for summer landings. Winter landings are made on the ice.

Umiat 1 was spudded on June 23. By early October, the hole was 1816 feet deep, then operations were shut down, due to freezing of the water supply which came from a nearby creek. In the progress of drilling, four oil sands were encountered at depths of 200, 500, 1300, and 1350 feet. The first three were approximately ten feet thick, and the fourth considerably thicker. Showings were from saturated cores that bled oil of approximately 35-42 gravity. The oil contains no gas, but cold tests indicate it will flow through a line at very low temperatures without heating. The shows would not respond to drill-stem tests.

Equipment consists of a diesel-powered rig capable of drilling to approximately 7500 feet. Four D-13,000 Caterpillar Diesel engines are used, two on the pumps and two on the draw works. The exact location for the well is on an outcrop of hard sandstone, which eliminates equipment foundation trouble, since in the Arctic the active freezing and thawing zones with the permanently frozen formation known as the permafrost underneath, present a new kind of problem to construction.

The well was spudded with a big hole and a 26-inch conductor string was set five feet below the bottom of the cellar which was 8x8 feet, in the hard sandstone and shale outcrop. Drilling was with a 22-inch rock bit to 97 feet, where a 16-inch conductor string was set. The hole was then reduced to 15½ inches to 685 feet and 11¾-inch outside diameter casing cemented to the surface. From that point on to the bottom the hole is 10⅝-inch. Drilling is by ratholing ahead with a 7⅝-inch wire line barrel, and then reaming to 10⅝.

Hard Drilling

Digging has been extremely hard, in the sandstone and shale all the way down. Average hole per hour was from six to eight feet, and one bit lasts from 50 to 60 feet. During the time the well was drilling, the average footage made per day was from 50 to 75 feet. Supervising engineers said the drilling was as hard as any they had ever done in Southwest Texas or the Mid-Continent. There was a tendency for the bit to slide and extra weight had to be used at times.

The only difficulty run into was several twist-offs of drill collars and two fishing jobs resulted, but the collars were recovered on the first trip in. An ice-filled fracture in the sandstone was encountered and returns appeared in the rathole and cellar, but the fracture turned out to be a small one, and circulation was easily restored. Even the sandstone appeared to be frozen, as indicated by the cores when first taken from the well. They were hard and crisp and would break with the slightest rough handling, like so much ice, when first taken out. Within a short time they would soften and crumble when exposed to warmth. On an average the ground is frozen to a depth of 500 feet in the Umiat region.

Weighted mud was used, but due to the presence of siderite (iron carbonate) in the sandstone, the mud had to be lightened constantly. It had a tendency to build up to where it would exceed 11 pounds per gallon. No heating of the mud was required last summer, but coils will be installed in the pits so that if work is carried on in cold weather next year, the mud can be heated.

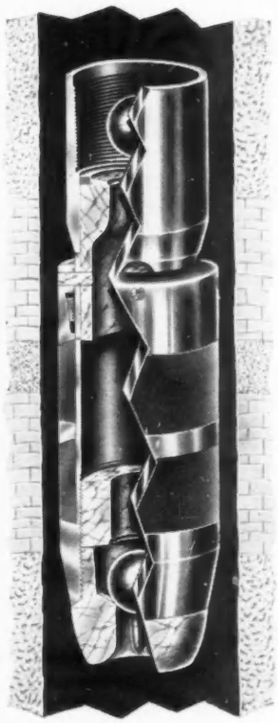
Water for the well and at the camp at Umiat is obtained from Seabee Creek. Although it is colored a "nasty brown" by the tundra grass and other vegetation, it tested pure. Some will power was required to learn to drink it, however, due to the unusual color.

Since the whole procedure in connection with the well has been of a pioneering nature, every scientific device known and accepted by the oil industry is in use, the idea being to gather data painstakingly and constantly, so that an exact and complete record can be had. These devices include a slope tester, equipment for electric logging, temperature measurement apparatus, gas detectors for perpetual sampling of the air in the mud, sidewall coring equipment, geolograph, and cementing equipment. All this equipment including the precision instruments was winterized for 70 degrees below zero before being put into use. So far everything has func-

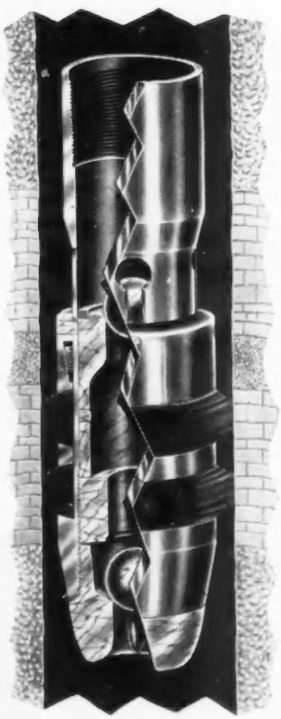
Setting up a core drill for geophysical exploration at Cape Simpson, 60 miles east of Point Barrow.

No. 3 of a series

Cementrol*



Running-in position



Position after setting

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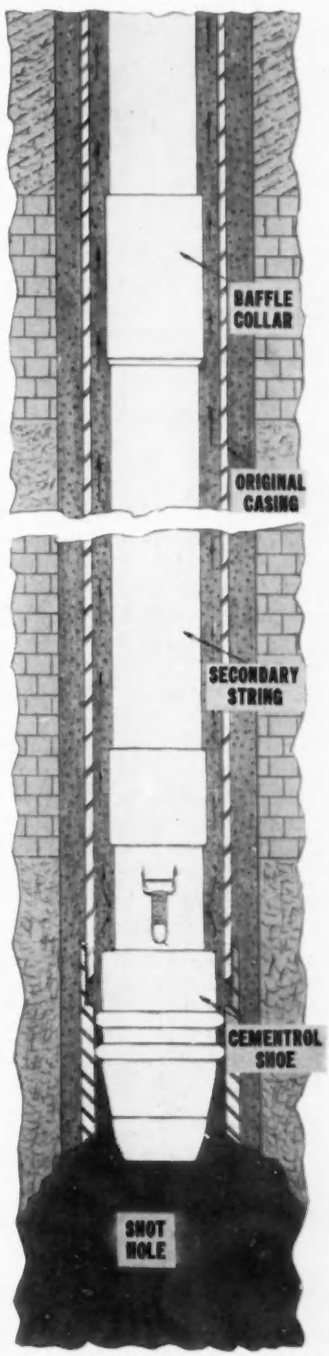
Literature giving complete details of design and operation of CEMENTROL equipment will be furnished upon request.



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Weasels and other equipment in operation at Umiat 1, shortly before the well was closed down.

tioned perfectly, indicating the measures taken were correct.

Diesel fuel is used at the well for drilling and for heating the camp. For the generators, a mixture of Diesel and gasoline was necessary to keep the valves from burning up.

Camp at Umiat

The camp at Umiat consists of six tents and two wanigans, one for a galley and one for the office. The tents are of a special water and wind-proof fabric in two layers, with insulation quilted between. Double floors are of wood, also provided with insulation. Tents and wanigans are heated with oil. The camp will house 30 men, the maximum size of the crew at the well, but the average personnel has been 22. In spite of the below zero mean average temperature for the region, during the summer which extends from June to October, the average temperature at Umiat is about 40 degrees and it may go as high as 70. Daylight during this period is approximately 24 hours.

Mosquitoes are a problem all by themselves at Umiat. They are in swarms during the summertime, and are ferocious. The writer say a picture of the back of one of the crew, taken at about six or eight feet away, and the man's back looked like it was covered with flies.

"Surely, you are kidding me, when you say these are mosquitoes." "No kidding, sir," said the photographer. "And I could show you some bigger than these if you were at Umiat in the summer."

Nets and repellent sprays are used with some success, and next year it is hoped that the repellent-type bomb used by the armed forces in the tropics will be available for Umiat and Barrow.

Corrosion has not been a problem on the well. In fact, on the equipment up to this time, corrosion is not as noticeable as in the average oil field in the United States.

In answer to the question as to what conclusions can be drawn from the functioning of all equipment used in the operation at Umiat, this summary was given by the engineers in charge: Bearing in mind that equipment has been winterized as far as possible, by which is meant that the equipment has been made to operate in the coldest climate, the actual operation is little different from any other place. Care must be taken to see that water jackets do not freeze through constant use of some anti-freeze agent. Some of these have been known to freeze solid in the container at Umiat, but when mixed with water, they do not freeze. Also lighter lubricants have to be used. During cementing operations, the mud inside the casing was kept hot with steam while cement was setting.

As for the conditions at Camp Barrow, the Seabee base from which all operations at Umiat spring, the writer felt that they were amazingly good considering the location and distance from the rest of Navy activities. "Being able to survive was the greatest headache," the Commander said—no slight headache, at any time. But the camp now accommodates about 300 men and has had as many as 700 when ships had to be unloaded. The 700 peak was in August when three Liberty ships arrived with supplies for this winter. The average complement is 200 men.

Because the ground thaws only a few inches at Barrow, there is no drainage. All the Quonset huts and buildings have three layers of flooring with insulation between to keep the heat from inside from thawing the ground underneath and causing the buildings to move off their foundations. Also, the floors are always cold. Men that sleep in the lower bunks are apt to be colder than those in the upper!

On the land side of the camp there are three lakes, two salt water, and one fresh water. The fresh water lake does not freeze solid and supplies water for the camp.

The Navy found inadequate the Arctic clothing provided by itself and the Army. As a result, considerable thought and attention have been given to adapting Eskimo wearing apparel, with good results. Fur-lined parkas were found to be inadequate, and a double layer, quilted fabric type, with insulation between the fabric, and a fur-lined head covering was adopted. Pants are lined with a heavy layer of felt and are of a special grade of mercerized khaki outside. Leather footgear is entirely unsuitable, since leather stiffens in the cold. A type of felt shoes has been evolved with an insole of felt in the bottom, and felt uppers. Three pairs of socks afford the surest foot protection: first, a pair of thin cotton socks, next a pair of thin wool socks, and then a pair of thin felt socks—all worn with the felt shoes. Also when it is necessary to be in the snow, a fur or fleece-lined overshoe of rubber is worn over the felt shoe, and the overshoe zips up almost halfway to the knee.

The usual flight gear which consists of the quilted parka, the felt-lined pants, and the fleece-lined shoes, was not adequate for mechanics who have to be active in their work. Consequently, a special mechanic's suit has been worked out, over which is worn a special 16-ounce weight material snow-shirt, an adaptation of the native shirt.

Long-handled woolen underwear goes without saying. Gloves have to be of wool, with leather overgloves worn also. The ruff on the parkas is of Wolverine fur which has the peculiar quality of not holding ice. The breath will not cling to this fur as it will to ordinary fur when the temperature causes the breath to freeze. Frosting up of the parkas was a serious difficulty before the change was made to Wolverine fur for the ruff.

In the early days of the camp, laundry was a major problem. This summer a laundry was built, however, and is now in operation. Also, since most of the gear is woolen, the problem has dwindled.

No report on the operations at Barrow or Umiat would be complete without a tribute to the Weasel, or Amphibious Jeep, the M-29-C. These amazing vehicles look like a cross between a tractor, a bulldozer and a Model-T Ford, but their performance on the snow and ice on the Arctic plain, is astounding. They go everywhere and do everything with startling speed and dash. To say they are built for comfort would be somewhat of a draw on the imagination, but when it comes to getting the job done, at Barrow, to use a very modern, expressive term, they are "out of this world".

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An Oil Colossus of Tomorrow

South America, and particularly the Caribbean area which includes Venezuela and Colombia, is one of the important world areas expected to play a significant part in the future petroleum economy of the world. Twelve percent of the petroleum reserves of the world are located in the two countries, with the bulk of this in Venezuela. *The Oil Weekly* recognizes the potential of the two, and their high place in the list of localities from which great reserves are yet to be discovered, and has just completed a comprehensive survey of the oil situation as it now exists in Colombia, Venezuela, and Trinidad, British West Indies.

George O. Ives

The survey was made by George Ives, foreign editor, whose background includes nearly 20 years of association with the petroleum industry. More than ten years have been as a writer, during which he was concerned with all phases of the industry from engineering to economics, and he also spent 20 months in the Petroleum Administration for War, concerned with problems of development, production, and transportation. The South American survey just concluded required 2½ months during which he contacted government officials, and oil company personnel, both being very cooperative in furnishing information as to past, present, and future activities. The survey included observation of all phases of field activity and visits to all principal producing areas.

In the series of articles published in this and subsequent issues we will attempt to present a comprehensive picture of the petroleum industry as it is in these countries, current and prospective exploration, production, transportation and refining operations, with a view of the local conditions, problems faced by operators, and how they are met.

THE expected cut in Venezuela's production has thus far failed to materialize, and is not likely to come soon. During the week ending October 13, the country produced a daily average of 969,600 barrels, surpassing the previous peak of 965,000 barrels during the week ending August 13, 1945.

Bulk of this production is from the Maracaibo Lake basin area, where the 3000-odd wells of the three principal producing companies are capable of substantial output. The on-shore and near-shore lake concessions operated by Venezuelan Oil Concession and Mene Grande Oil Company, respectively, are contributing substantially to the production at this time, but the wells are for the most part on artificial lift, and these particular areas have been reduced to more or less settled production. The flush production, and that which is expected to continue through many years, is the area from about one kilometer offshore, extending out into the lake a distance of ten to twelve kilometers in the Tia Juana and Lagunillas areas operated by Creole Petroleum Company. Far from being settled production in defined areas, the company has continued to complete good wells as far as it has stepped out into the lake, and there is still no real information to indicate just how much farther the productive limits will extend.

Important Test

One extremely important test is slated for the near future, several kilometers past all present limits of production in the Tia Juana area on a concession in the center of the lake owned by Venezuelan Oil Concessions, Ltd. The well will be drilled by Creole since that company has had all of the experience in drilling wells in deep water, and has developed the method of using caisson foundations to operate in 90 feet of water. Foundations and special piling have been installed, but operations are awaiting construction of special experimental equipment.

The producing localities of Venezuela may be divided roughly into four separate areas, each comprising groups of individual producing structures. Three of them—Jusepin and Quiriquire, Oficina, and the Lake basin, contributing the lion's share of present production. The other principal area is the San Joaquin group which includes San Joaquin, Guario, El Roble, Santa Rosa and Santa Ana fields.

For present statistical purposes, since different companies have adopted the policy of giving a different name to the various concessions, the Jusepin group of extreme Eastern Venezuela consists of six areas: Quiriquire, Jusepin, Mulata, Muri, Santa Barbara, and Travieso (sometimes called Santa Barbara). Actually these fields, with the exception of Quiriquire, are all one field with no break in production from the most easterly end of Jusepin to the most southwesterly limits of the Travieso area. Collectively the five latter fields are producing nearly 4 million barrels monthly, or at the rate of 129,000 barrels daily, with another 50,000 barrels a day being added by Quiriquire field.

The Greater Oficina area comprises another group of fields, producing from sands of the same age, and all of similar structural characteristics. This group includes Oficina itself, Leona, East Guara, West Guara-Guico, and Yopales, which is not presently producing. All are structures which owe accumulation to normal faulting, and in fact Oficina itself is not one continuous reservoir, but is a system of faulting which separates the field into a dozen different areas, all close enough together to allow grouping into one area. This group collectively produces about 3,300,000 barrels monthly, or slightly more than 100,000 barrels a day. The rapid rise of West Guara to an important position in Venezuela's production is shown by the production of nearly 2 million barrels monthly from this one area of only 3500 acres. Oficina, the original producing area, spread out over an area of 12,275 acres, produces now at the rate of 1,250,000 barrels monthly. Leona's 12 wells make about 48,000 barrels monthly.

It must be remembered that since all but 90,000 to 95,000 barrels of Venezuela's production is slated for export by tanker transportation, production figures are subject to fluctuation with tanker availability. At this writing there is adequate available pipe line outlet to terminal points for all of these fields, and adequate loading facilities at terminals to take care of the full productive capacity of the crude sources.

Principal Outlets

The principal crude outlets from the three main producing areas in Eastern Venezuela are furnished by Mene Grande, Creole, and Companie Consolidada de Petroleo. Mene Grande has a 16-inch welded line from Oficina, through its Anaco station at San Joaquin, to terminal at Puerto la Cruz. Creole has a 16-inch line from the Jusepin area to the

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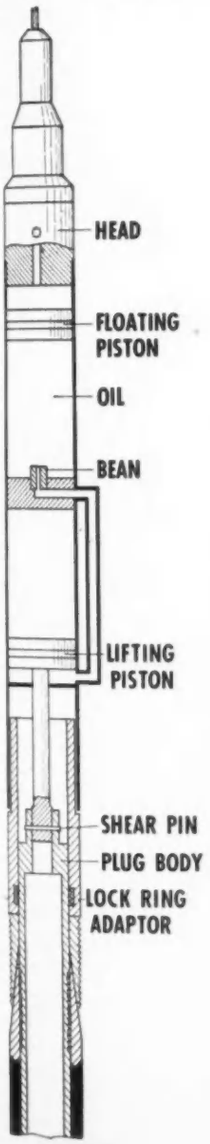

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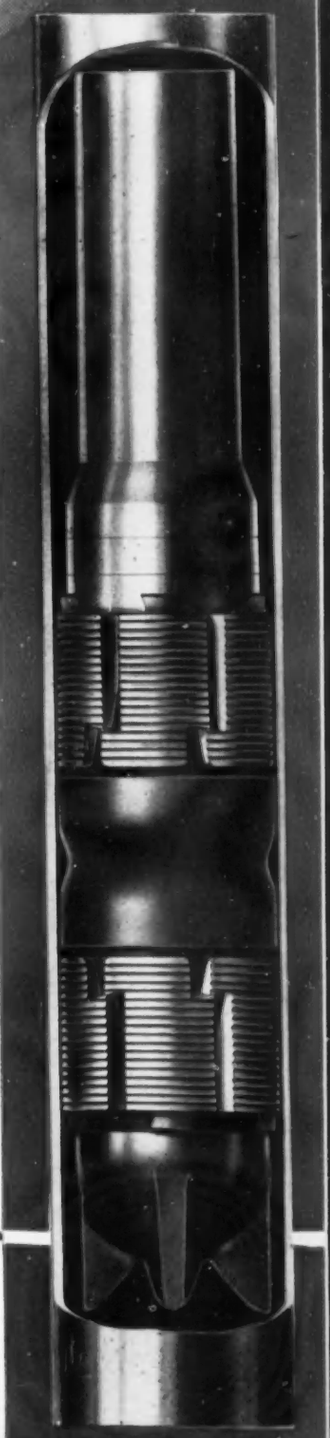
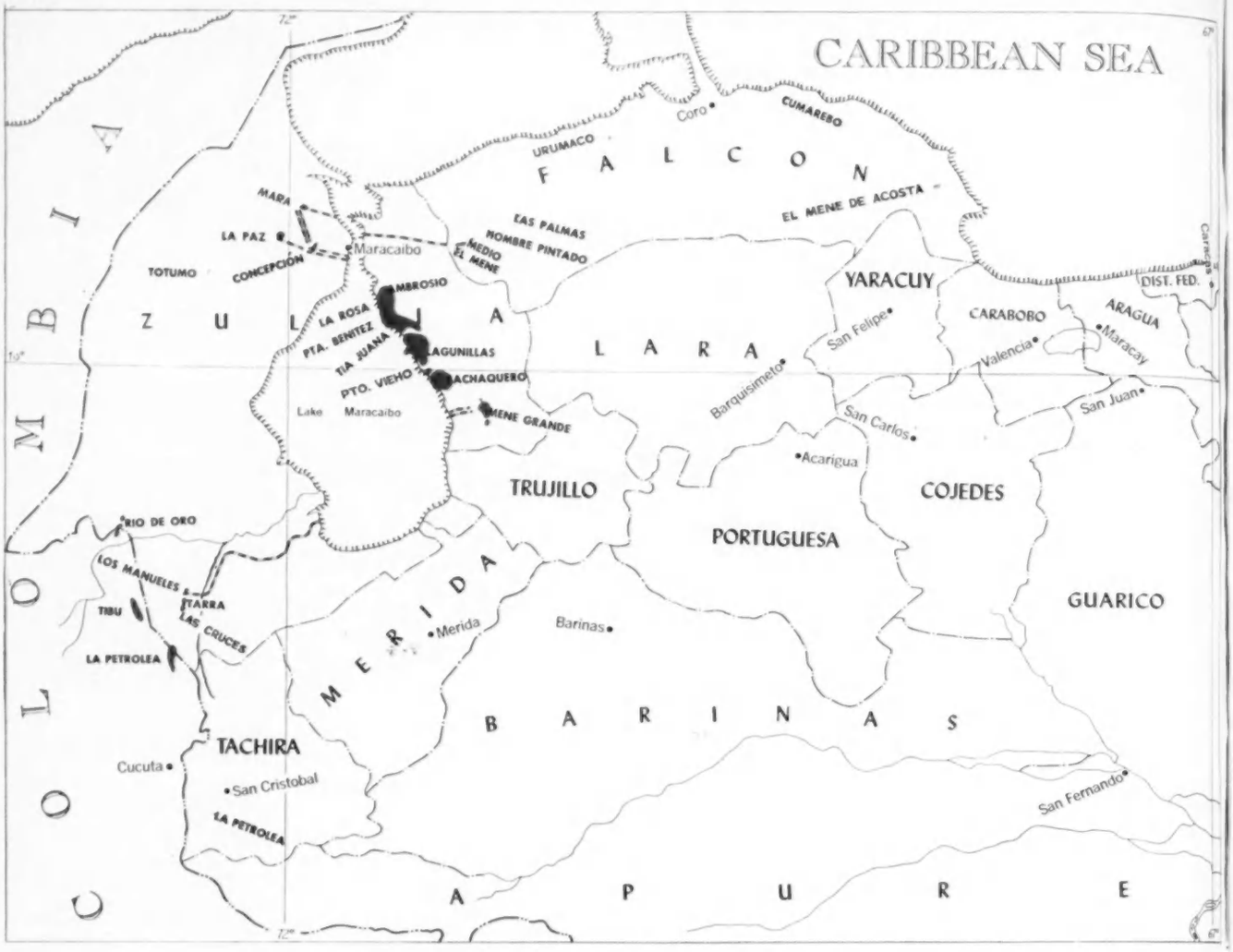




Oil fields and pipe lines of Western Venezuela

same terminal, and Consolidada's 12-inch line, latest to be completed, originates in the Santa Barbara field and terminates at Chaure, a few kilometers from the Mene Grande terminal, and on the same harbor. All three lines are approximately 155 kilometers long. In addition to these outlets on the north coast, Creole has a 10-inch line from Jusepin to Caripito, a distance of 74 kilometers, and two lines an 8-inch and a 10-inch, from Quiriquire to Caripito, where harbor and loading facilities are available on the San Juan river for crude or products. This makes for a flexible system whereby part of the Jusepin crude is moved to the refinery at Caripito, which also processes considerable Quiriquire crude, while the bulk is moved westward to Puerta la Cruz.

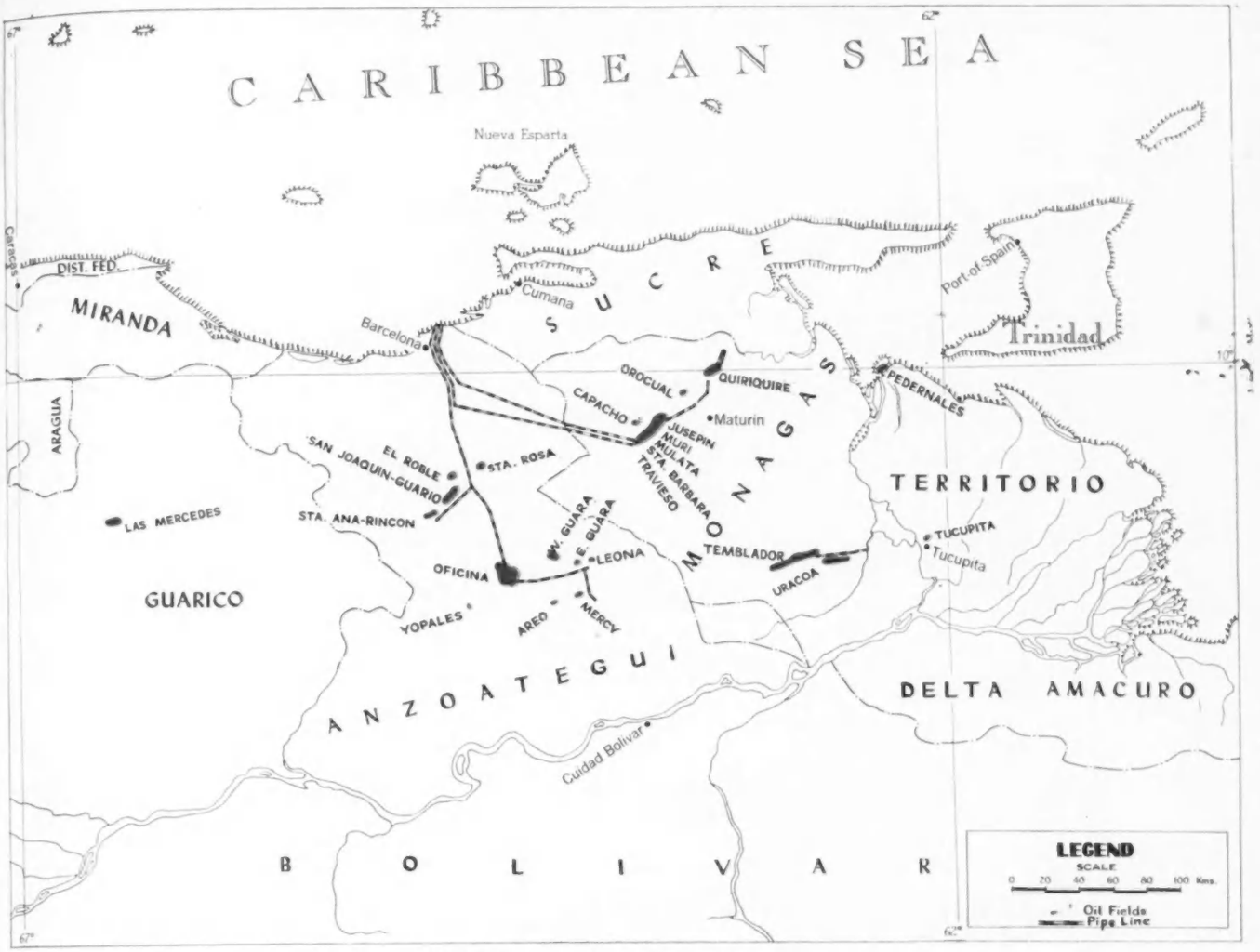
San Joaquin, and the other fields in the vicinity—Guario, El Roble, Santa Ana, Rincon, and Santa Rosa—form a group which is distinctly different from the other main Eastern Venezuela groups in that all of these fields are anticlinal or dome structures. The Jusepin group are all basically stratigraphic traps with some faulting, being the result of wedgeout of the Miocene, and other sands against the northern coast range of mountains. The Oficina group are all fault accumulations.

As is the case throughout most of Venezuela, production in the San Joaquin area is largely from the Miocene, with deep wells prospecting the Eocene around Santa Rosa and El Roble not yet establishing important production from that deeper formation. The entire area accounts for an output of something more than 26,000 barrels daily. The best producing unit in the group is San Joaquin, which accounts for some 13,000 barrels per day. San Joaquin field has three rigs running, two by Creole and one by Socony, while Mene Grande is operating one rig on a deep test in the Santa Rosa area.

The Las Mercedes field, in central Venezuela and some 225 kilometers west of the San Joaquin group, is still an unknown quantity as to sustained output since lack of pipe line outlet has forced closing in of wells as fast as they are completed. But the dual completion program in the field, together with reports of productive capacity of some of its wells, indicate that a not inconsiderable amount of crude could be produced by its 12 wells. By the time the pipe line is provided the five rigs in the area, (four running and another preparing to start) should have added a number of additional producers.

Lake Maracaibo Area

The area which has had the most profound effect on Venezuelan economy is on the east side of Lake Maracaibo, still the most important contributor to the nation's production. The four principal producing areas here, Lagunillas, Cabimas, Tia Juana, and Mene Grande, are responsible for a cumulative production, to the first of August, 1945, amounting to 2,346,141,340 barrels of oil. The Lagunillas field alone was producing at the rate of 285,000 barrels a day at the end of August. Recent extension of production farther out into the lake bed at Lagunillas and Tia Juana indicate no lessening of productive potential in the



Oil fields and pipe lines of Eastern Venezuela

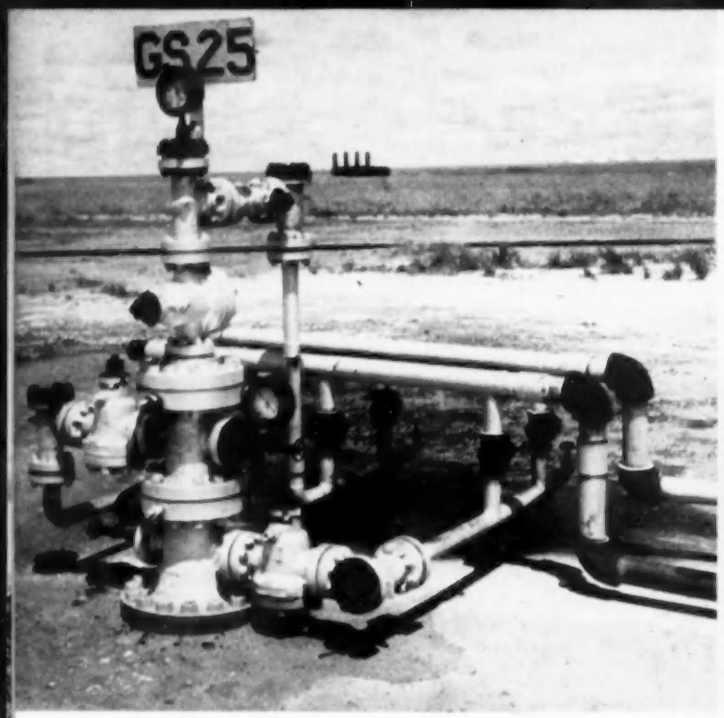
Lake area for some time to come. Production is from Miocene and Eocene sands, much of the offshore production being from the latter formations.

Prior to the later part of 1944 and early part of 1945, the area northwest of Lake Maracaibo, which included the La Paz and La Concepcion fields was relatively unimportant, these two fields having at that time established a production from the Eocene formation resulting in production of only 5,000,000 barrels during 1944. However, deeper drilling in the La Paz field by Venezuelan Oil Concession, Ltd., in early 1944, established upper Cretaceous production at a depth of 4446 feet, about 1500 feet below the deepest Eocene pay in the area. The company's P-62 well produced 34-gravity oil at the rate of 800 barrels daily through a 5/8-inch choke. Following this discovery, the company drilled P-78 in the same field to the Cretaceous, penetrating deeper into the formation and completing in August, 1944, at 5397 feet for a production of 4000 barrels daily through 5/8-inch choke, 33.4-gravity oil. Opening of this deep pay was considered the most important development of the year in Venezuela because of the great productive capacity of the formation, and the possibility that it might be found underlying the Miocene and Eocene formations throughout a large part of the Maracaibo Lake basin, although in most of the area it will lie at depths beyond the reach of present day drilling. There still remains an enormous area in which this formation might be prospected at reasonable depths.

The importance of the Cretaceous was further enhanced early this year with the successful completion of Caribbean Petroleum Company's DM 2, wildcat 33 kilometers north of La Concepcion field which was started late in 1944 and completed in February, 1945, at a depth of 6011 feet in Cretaceous. This one well has already produced, in the relatively short time since a pipe line outlet was provided, more than ½-million barrels of oil.

The nation, now the third largest producing country in the world, is capable of producing more than a million barrels daily, and has transportation facilities to transport all of this amount. Operators feel that for some time to come Venezuelan oil will be in a position to compete in the world market with very little looked-for decrease in present production rates for possibly a year to a year and a half. Much of the future of Venezuelan oil hinges upon the continuation of understanding between the government and the operating companies. They feel that under present conditions the oil can find a ready market at a figure which will enable them to operate under economically sound conditions. Many see the Near East, with its readily and cheaply producible reserves as the only threat to continued oil prosperity for the country, with hope that if and when such a threat materializes, certain adjustments will be made by Venezuelan authorities which will make continued competition possible.

In this connection, the Cretaceous discoveries by the Shell group in northwestern Venezuela are considered doubly important. They show great potential producing possibilities per well drilled, and in addition are situated conveniently as regards transportation to world markets.



Christmas tree hookup for triple-zone completion in West Guara field. Dual flow lines are provided from each well to central pick-up stations so that any one zone may be tested separately without closing other two.

Typical drilling well setup in West Guara-Oficina district. Medium duty rigs are used since there is no necessity for drilling below 8,000 feet.

West Guara (Venezuela) Development

EASTERN Venezuela, rapidly approaching the older Western Venezuela area in importance, and the source of much of the critically needed oil for the successful prosecution of World War II, has presented some very interesting and complex problems to those companies who have established themselves as producers in the area, and the intensive search for new oil has resulted in discovery of prolific fields.

Perhaps the most interesting of the fields in the eastern part of the country is West Guara. Relatively small in area, and still relatively small in output, it is still one of the more outstanding fields of Venezuela. This for a number of reasons, ranging from the characteristics of the crude produced from the various horizons, variation in gravity of crude from the same sands at different points on structure, and from the standpoint of complexity of operation.

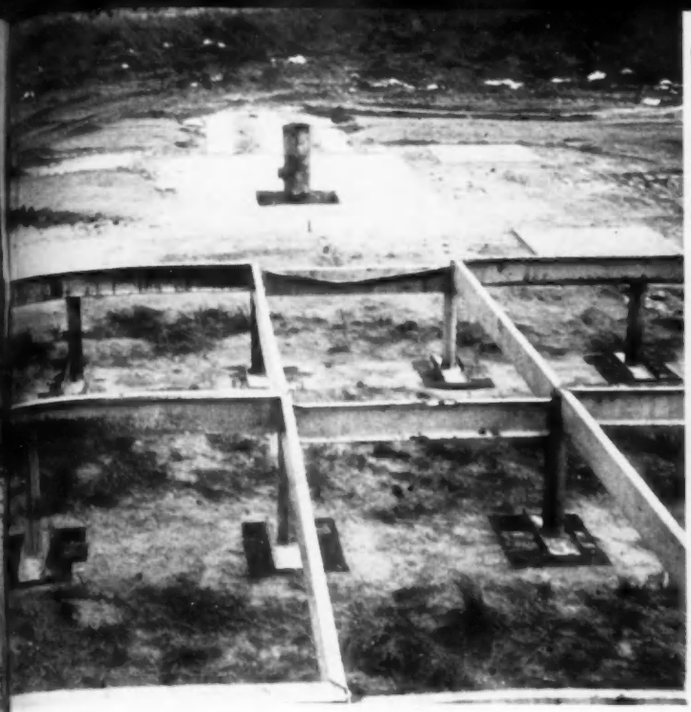
Geographically, the West Guara field is 175 kilometers south of the northern coast of Venezuela in the central part of the state of Anzoategui, being just slightly east of south from Puerto la Cruz, the main terminal for Eastern Venezuela oil, and also the main point of entry for materials. It is one of the fields referred to as the Greater Oficina area, and was discovered by slim-hole structure drilling, one of the most effective forms of exploration in the savannah country of central and eastern Venezuela, following seismograph work which gave evidence of some kind of anomaly.

Opened in 1942

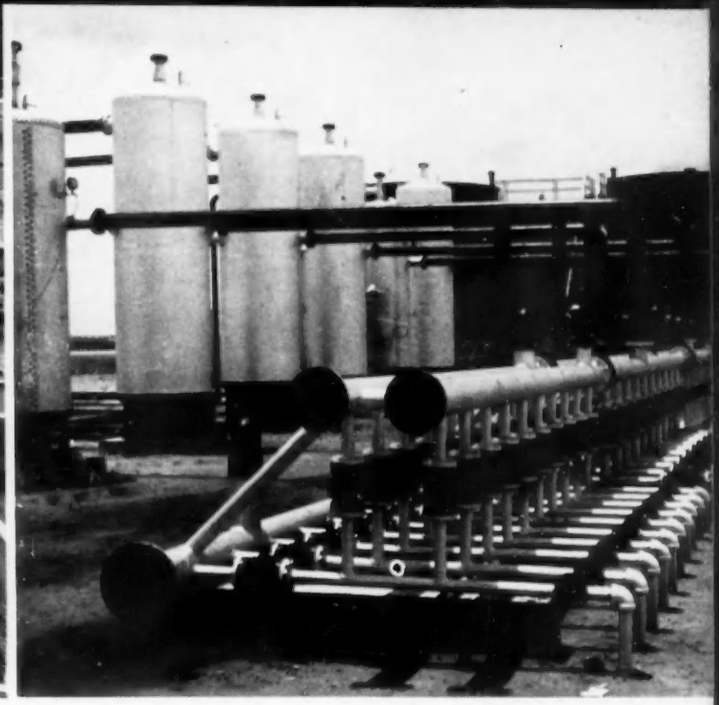
The field was opened on June 2, 1942, with completion of Mene Grande Oil Company's first well. Development was slow during the early stages, principally due to the wartime shortage of materials which was slowing down development in all new areas and limiting most drilling to wells which might be expected to contribute materially to production. In September of 1943, there were only three wells in the field and they were shut in due to lack of pipe line outlet. At that time a rig was moved in to concentrate development in the field which was beginning to show promise of being very prolific due to the large number of sands found in each well, and the fact that more than one sand could be opened to production in each well. Activity gradually increased until Mene Grande had a top of eight rigs running in the field at one time. Meantime, the field had been extended west on Socony-Vacuum Oil Company's Guico concession by a well completed April 1, 1944. Now there are six rigs kept busy in the area by Mene Grande and three by Socony-Vacuum.

Within a year after October, 1943, when the field was first placed on production, at which time there were only three wells, the field was producing as much as 1,400,000 barrels of oil during a single month, and would have been capable of still greater output had there been unlimited tanker transportation available. Although there has been only one dry hole in the field compared with 97 producers, the field is fairly well delineated by subsurface information already compiled, but many wells remain to be drilled.

The operators were called upon to lift production from the area to its highest maximum consistent with good practice, and the activity had been con-



Prepared location for well showing concrete cellar, derrick foundations, and foundations for engine house. Sectional pipe racks have been constructed and pits have been filled with mud from previously drilled well.



Manifold at flow station where all flow lines lead in from wells. With this setup it is possible to test individual horizons and production records show output of each horizon as well as individual wells. Sections are prefabricated in shops and added as needed.

Field

Though relatively small in size and output, the area is one of the country's most interesting

By GEORGE O. IVES, Staff Writer

centrated on the West Guara field because of the peculiar conditions which would make for the greatest maximum output per foot of hole drilled.

The field has been developed throughout on a multiple-zone completion system, with a large percentage of the wells brought in as triple-zone completions. Most of the earlier wells had been dual-completed. The first triple completion was in July, 1944, and there since have been 28 triple-zone wells finished with many of the dually completed wells scheduled to be converted into three-way producers. The production division of Mene Grande Oil Company, faced with pleas for more production from the area, decided that the triple-zone completion system was the best and quickest way in which to build up production, and devoted much thought and action to working out the best methods of multiple-zone completion. The operation has now been reduced to a more or less routine, and practically trouble-free system, using standard available equipment. One of the main disadvantages has been that it is impossible to keep a reservoir check of bottom-hole pressures, etc., on the upper sands in the series from which a particular well is completed, but this was discounted in the urgency of the program.

Completion Method

Triple-zone completions at West Guara are made with a full string of 7-inch casing for the oil string, and an intermediate string of 4-inch casing, with the lowest sand taken in in the completion produced through 2-inch tubing. Only two packers are used in completions, a regular 7-inch by 2½-inch tubing packer, to be set to seal off bottom perforations, and a collapsible packer between the 4-inch and the 7-inch set between upper and intermediate perforations. The casing is first perforated opposite the three sands selected, next the 4-inch pipe is run, having been previously perforated at an accurately measured point opposite the intermediate perforations, the 4-inch being swedged down at the bottom to take a length of 2½-inch tubing on the end through which the lower sand will produce. The 2-inch tubing, when run, is seated and sealed in the bottom of the swedged portion of the 4-inch, so that fluid will flow from the nipple on bottom of the 4-inch, through the 2-inch tubing without entering the space between the 4-inch and the tubing. The regular tubing packer is set around the lower nipple, below the swedge, and the collapsible wall packer is set between 4-inch and 7-inch and above the intermediate packer.

With this hook-up, oil flows from the lower perforations through the nipple and 2-inch tubing. Oil from intermediate sand flows through annulus between tubing and 4-inch intermediate string, and oil from the upper perforations flows through the annulus between the 7-inch and 4-inch pipe.

Normally, wells completed in this manner have been found to perform very satisfactorily on ¼-inch or 5/16-inch chokes, and will average something like 450 barrels to better than 500 barrels per sand on the smaller choke, so that triple-zone wells produce around 1200 to 1500 barrels daily with no apparent ill effects. The possibilities for continued production from the field are almost unlimited in spite of its relatively small area, (approximately 3500 acres) since to date there have been 39 separate sands drilled, identified, and tested in various parts of the field. All of the 39 sands do not extend throughout the entire field, but a good

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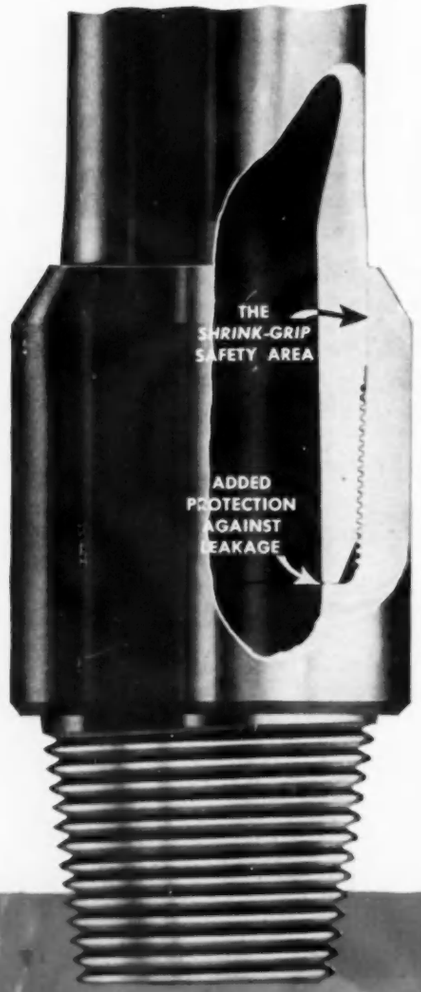

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FULL HOLE

SIZE	Tool Joint Dia. O.D.	Tool Joint Dia. I.D.	Tool Joint Length Approx.	Diameter of Upset Drill Pipe: Diameter of Land	Diameter of Upset Drill Pipe: Inside Diameter
*2 7/8"	4"	1 3/4"	17"	3"	1 1/4"
3 1/2"	4 5/8"	‡2 1/16"	18"	3 5/8"	2 1/4"
4"	5 1/4"	2 11/16"	20"	4 1/8"	2 11/16"
4 1/2"	5 3/4"	†3"	20"	4 5/8"	3 5/32"
5 1/16"	7"	**3 11/16"	22"	5 11/16"	4"
6 5/8"	8"	5"	24"	6 3/4"	5"

Note: Acme Full Hole can be Furnished in Sizes: 3 1/2"–4 1/2" and 5 1/16".
* Reed Full Hole, Not A.P.I. Standard. † 2 11/16" or 3 5/32" Optional.
** 4" Optional. ‡ 1 3/4" Optional.

SEMI-INTERNAL FLUSH

SIZE	Tool Joint Dia. O.D.	Tool Joint Dia. I.D.	Tool Joint Length Approx.	Diameter of Upset Drill Pipe: Diameter of Land	Diameter of Upset Drill Pipe: Inside Diameter
3 1/2"	4 7/8"	2 1/16"	18"	3 5/8"	2 1/4"
4 1/2"	6"	3 5/16"	20"	4 5/8"	3 5/32"

Note: The Tool Joint Box and Pin Connections have 4 A.P.I. Threads per Inch, with Larger Pin Diameter than A.P.I. Full Hole.

REED *Super Shrink-Grip* TOOL JOINTS FOR INTERNAL FLUSH DRILL PIPE

SIZE	Tool Joint Dia. O.D.	Tool Joint Dia. I.D.	Tool Joint Length Approx.	Diameter of Upset Drill Pipe
2 7/8"	4 1/8"	2 1/16"	17"	3 1/4"
3 1/2"	4 3/4"	2 11/16"	18"	3 7/8"
4"	5 3/8"	†3"	20"	4 5/8"
4 1/2"	6 1/4"	3 3/4"	20"	5 5/32"
5 1/16"	7 3/8"	4 11/16"	22"	6 1/8"
6 5/8"	8 1/2"	5 11/16"	24"	7 5/16"

† 2 11/16" or 3 5/32" Optional.

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Unitized boiler battery. All possible conect ons arranged so that battery is ready to be moved within a few minutes of time disconnecting starts.

Engine house being winched onto trailer by tractor which will move it to new location.

portion of them will be found in any well in the field. During the month of August the field produced more than 1,700,000 barrels, and its full potential was somewhat curtailed due to the fact that wells had to be shut in part of the time as tanker shipments from Puero la Cruz varied.

The field is being developed on two grids, each of which have uniform spacing patterns. The upper grid ranges from about 4500 feet to around 5500 feet, and the lower grid from 5500 feet on down to 7900 feet, although most of the wells are being produced from sands above 7000 feet, since another peculiarity of this field is the gravity range, which varies from as low as eight to ten degrees to as high as 57 degrees. The heaviest oil is very thick and tarry, and some of the lighter oils have a tendency to be waxy. The 57-gravity oil is definitely crude. It is black in color, and is produced through ¼-inch chokes at gas-oil ratios ranging from as low as 450/1, to no higher than 750 or 800/1.

The upper sand in this field produces around 20-gravity crude, but all other sands down to around 6250 feet in depth yield oil which ranges from 43 to 53 gravity. At about 6250 feet, the gravity of the oil starts to decrease with depth to the heaviest oil at 7900 where it is eight to ten gravity. The decrease is gradual and uniform. In all sands where oil is around 30 degrees or lower it is found that gravity has as much as ten degrees variation with structure. It has been found that in these sands it is possible to contour on gravity of oil from producing wells and the picture will almost exactly coincide with contours on structure.

All Flowing Wells

At this stage of the life of the field, all the wells are flowing, with no pumping or other artificial lift units necessary, and no water troubles, as the wells all produce pipe line oil.

West Guara, in common with the other fields in the greater Oficina area, is a fault structure, with the major fault along the south side of the field, trending northeast and southwest, with a throw of approximately 450 feet. Production is found on the upthrown, downdip side. The field is about 7½ kilometers long from southwest to northeast, and about 1¼ to 1½ kilometers wide. It is situated in the Orinoco Basin, which contains most of the production in Eastern Venezuela. Its southern boundaries are formed by the outcrop of basement granite along the Orinoco River, with basement found slightly below 8000 feet in the Oficina area. To the north in the San Joaquin area the basement is much deeper, one well having gone to 11,294 feet without reaching the basement rock. Farther north it rises against the northern range of mountains. To the west it rises again in western Guarico, and east of the Orinoco delta to the east. In common with practically all of eastern Venezuela's oil areas, West Guara produces from Miocene sands. The sands are not of any great thickness, but are quite permeable and good producers. A 5400-foot well will penetrate from 12 to 14 sands which will have a combined effective thickness of from 185 to 250 feet.

Moving derrick on its own skids, drawn by two tractors and two heavy trucks.

Drilling conditions are almost ideal, since very litle hard drilling is encountered until near the lower part of the hole, and it is possible to drill the first 4500 to 5000 feet of hole with three-way drag bits, making this much hole with no more than two bits, at which depth it is necessary to change to rock bits. Very little coring is done, and this with a conventional barrel instead of wireline coring. Commercial electric logging, cementing, and perforating services are available here, as they are throughout most of Venezuela. The greatest single difficulty encountered in field operations is in getting proper cement jobs. For some reason it is impossible to get cement for more than 500 feet above the shoe, and it is necessary to make several squeeze jobs on each well during completion operations. This contributes to the fact that wells are ordinarily completed to 5400, feet, average depth of the shallower wells, in 30 days. The 7000-foot wells will average 40 days from rigging up to completion.

Very little time is consumed in this field in tearing down, moving, and setting up rigs, since the terrain is almost perfectly flat, with no vegetation other than prairie grass, and sandy soil which gives little trouble even in wet weather. The company has worked out a system of unitization of equipment which makes it possible to move the entire set-up in four main units, skidding across country a distance of as much as nine kilometers in as little as two hours. The rig is separated into four divisions—boilers, pumps, engine house, and derrick. By breaking only six connections, the engine house, with engine mounted, is removed from the derrick as a unit, and pulled up onto a specially built low trailer with caterpillar treads, and towed by a tractor to the next location. Boilers are mounted on skids and the entire setup of three 150 horsepower boilers is dragged across country to the next central location from which lines

WHAT YOU SHOULD KNOW ABOUT THE BAKER MAGNESIUM ALLOY CEMENT RETAINER

WHAT IT IS

Developed and pioneered prior to the war, production was deferred due to the scarcity of vital magnesium. The Baker Magnesium Alloy Cement Retainer now offered is completely successful for practically every type of service, and the demand for it is rapidly increasing.

Baker Magnesium Alloy Cement Retainers are easily drillable, and the only larger size parts not made of magnesium are the slips. These are made of nitricastiron, and are readily broken up.

They can be drilled up by using 2-inch tubing—and are readily drillable with cable tools.

A Magnesium Cement Retainer also can be used for short periods of time as a temporary bridge plug.

WHAT IT IS NOT

Retainers of magnesium are not recommended for permanent bridge plugs, although they may be so used for limited periods.

Baker Magnesium Alloy Cement Retainers are not so low in their purchase price as the cast iron type, but the overall "cost of results" is much less.

AND IT IS COMPLETELY SUCCESSFUL for all of these vital applications for which modern operators find the Baker Cement Retainer indispensable . . .

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CEMENTING BEHIND SECTIONS OF PIPE
TESTING UPPER CASED FORMATIONS
REDUCING GAS/OIL RATIOS
CEMENTING BAD PIPE
PLUGGING OFF BOTTOM FLUIDS
CEMENTING OFF TO PERFORATE FOR PRODUCTION
CEMENTING TWO STRINGS TOGETHER
CEMENTING LOW PRESSURE ZONES
AND OTHER SIMILAR OPERATIONS

BAKER Model "K" CAST IRON CEMENT RETAINERS

BAKER Model "K" Cast Iron Cement Retainers (illustrated at right) are not to be discontinued, but as for many years past, they will be found successful for any retainer service where the ultimate in easy drillability is not required; or where a permanent bridge plug is desired.

BAKER JUNK BASKET

THE BAKER JUNK BASKET is recommended for the removal of cuttings when drilling up any "drillable" materials such as magnesium alloys, bronze, etc. It is run just above the bit, and operates on the principle that by reducing the velocity of the circulating fluid (in which these cuttings are carried) as it enters the larger annular area around the drill collars, the cuttings are dropped out of the fluid and trapped in the Junk Basket.

For additional information on BAKER CEMENT RETAINERS—made either of Magnesium Alloy or of Cast Iron—consult the nearest Baker office or representative for courteous and intelligent attention and suggestions. There is no obligation.

BAKER OIL TOOLS, INC.

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GENERAL OFFICES: 6000 So. Boyle Avenue, Los Angeles (Mail Address Box 127, Vernon Station 11)—Phone JEfferson 8211

Principal function of truck is to pick up front part of skids a few inches so that they will move overland without digging in.

Tractors are chained to front of trucks and furnish most of motive power during moves.

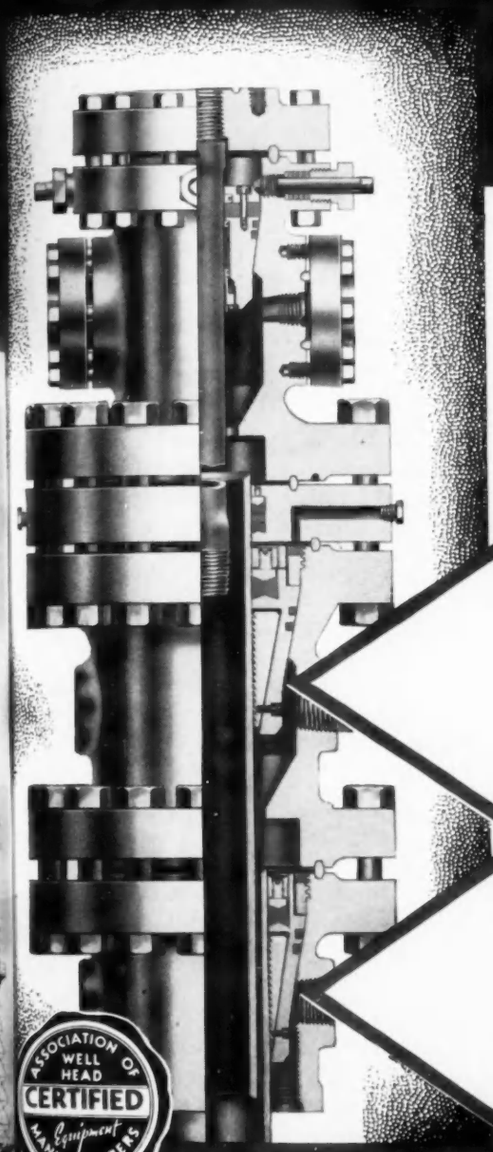
are strung for drilling several wells from the one boiler location. Derricks are mounted on skids of heavy timber, hand-hewn from native Vera wood. This wood is so hard that it cannot be handled by a saw mill, and holes have to be bored in it with machine drills.

While moving, the standpipe, mud lines, wire lines, tong lines, blocks, lights, and cat lines, are all left rigged up. The rotary table is usually removed and carried separately. Pumps are unitized, with slush and water pumps mounted on steel skids so that the whole unit may be winched onto one of the special trailers and hauled to the new location. The location has been previously prepared, with concrete cellar and foundations for derrick and engine house, with conductor pipe already set. Sectional pipe racks have already been built, and casing for the surface string already on the racks before the rig arrives on location. The whole layout is standardized, so that pits may be dug in advance, and when the mud line connection from the derrick is lined up with the mud line on the pumps, the suction lines will just reach into the pits. There is no waste motion, and the rig is taken apart, moved, and set up again in an unbelievably short time. Recently a well was completed one night, workmen started disconnecting rig at 7 a. m., rig was moved two locations away, and spudded in on a new well at 10 p. m.

Pumps being loaded for move. Two heavy slush pumps and one water pump are unitized on one skid. When unit is aligned at new location so that overhead mudline connects to manifold on the rig, all other connections, steam and water lines, will fit.

A rig on the move. By careful planning and unitization a rig may be moved from one location and spudded in the new well within 24 hours, and has been done in this area in 15 hours.

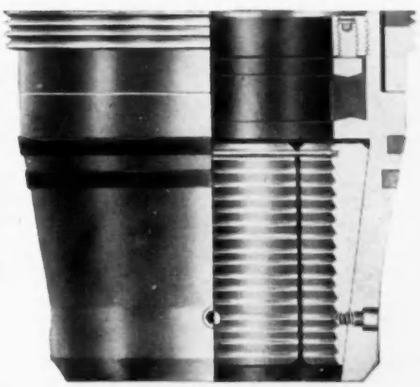
NO BOTTLENECKING
on longest casing strings with the new McEVOY
Type LHCS-2
CASING HANGERS



The new McEvoy Type LHCS-2 interchangeable Casing Hanger is especially designed to hold extremely long strings of casing. Danger of bottlenecking is eliminated because the weight of the pipe is distributed evenly over the large slip area which is backed up by a solid housing (not a split housing). Proved by hydraulic tests to have ample capacity to carry the longest strings of pipe being set in today's deepest wells. Proved, too, by field tests on many deep wells of leading companies.

The McEvoy LHCS-2 Casing Hanger is a simplified slip-pack type hanger, providing a positive seal without welding. Can be field assembled and tested before well completion. Carried in stock in all API casing sizes, and can be supplied in special sizes on order.

McEvoy casing and tubing hangers permit any type of completion.



LHCS-2

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McEvoy standards of research, engineering, manufacturing and inspection mean safe, trouble-free installations. McEvoy products meet API requirements and the standards of the Association of Well Head Equipment Manufacturers.

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MEXICO
Looks Ahead

Pemex Expanding Pipe Line System

Part 6

This is the sixth and concluding article in the series, "Mexico Looks Ahead." It rounds out a picture of what is going on and what is planned in Mexico's oil industry by presenting comprehensive data on the pipe line division. Some important pipe line system expansion is under way at present, and an important new trunk line is scheduled for early construction in central Mexico.

This series of articles on Mexico was launched in the first "Monthly International Feature Issue" of *The Oil Weekly* of November 5. In that issue the first three parts of the Mexican series were presented. They offered information on the organization and functioning of Petroleos Mexicanos, the government-operated oil company; outlined the current and proposed expansion programs aimed at meeting growing demand for petroleum products; and showed that determined efforts are being directed toward finding new crude reserves and gaining maximum recovery from present reserves.

The fourth article in the series appeared in November 12. It dealt with current and projected exploration and wildcatting.

Part 5 in the series appeared in the issue of November 26, and discussed drilling and production operations in fields and wildcat areas.

A report prepared for THE OIL WEEKLY by the production department of Petroleos Mexicanos under supervision of J. M. de la Garza Cardenas, head of that department.

There are three principal pipe line projects planned by Petroleos Mexicanos.

(1). The work to increase the capacity of the existing Poza Rica-Mexico City pipe line is already in full development.

(2). A project of a pipe line to supply a projected refinery at Salamanca from Poza Rica.

All the preliminary work to carry out this project has been completed, and it is expected that actual construction will be started by the end of 1945.

(3). A pipe line across the Isthmus has also been under consideration and several projects for different capacities have been studied, but nothing has been decided for the near future.

On the existing ten-inch pipe line to Mexico City nine new pump stations are being constructed, six in the same locations as the existing ones, one between Poza Rica and the first existing station, and two more between the last existing station and Mexico City. All these new stations will have electrically-driven centrifugal pumps. The existing reciprocating-pump stations will be used, without being moved, in the projected Poza Rica-Salamanca pipe line.

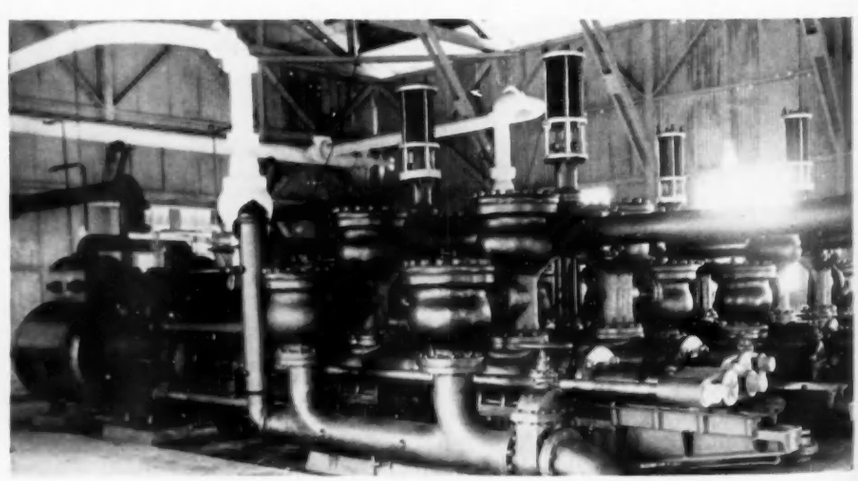
There will be no looping of the present line.

The present capacity of the pipe line is 22,500 barrels per day, and by the present work the capacity will be increased to 50,000 barrels per day.

With the increased capacity, the required oil supply for several years to come is expected to be quite fulfilled, and therefore, no further expansion is planned at present. Nevertheless, if in the future a new increase of capacity

■ CONTINUED ON PAGE 30
ALSO, SEE MAP, PAGE 28

Poza Rica-Mexico City pipe line is doubled for river crossing after floods interrupted service by washing out span of bridge and breaking line.



Pumps in pipe line pumping station in Tampico region

the

OTIS TYPE J

REMOVABLE

PACK-OFF *and* LOCKING ASSEMBLY

IS POSITIVELY LOCKED
WITH PERFECT SEAL

in the **OTIS TYPE J**
LANDING NIPPLE
and **FLOW COUPLING**
which are installed as
STANDARD EQUIPMENT

when the well is tubed

The redesigned OTIS Type J Removable Locking and Pack-Off Assembly (Yellow) has a mechanism already proved in over 2500 "Side-Door" installations. It operates from a definitely located seat furnished by the OTIS Type J Landing Nipple (Red) and Flow Coupling (Blue) which are included as part of the tubing string. Fitted in the J Nipple with a *metal-to-metal* lock and a *slide-fit*, this assembly facilitates the use of sub-surface controls to their greatest advantages . . . positive operation under any pressure and temperature up to 10,000 p.s.i. and 350 degrees.

The pre-set and acid resistant packing of the Type J Assembly forms the most efficient seal of its type ever designed. Flowing the well is not necessary to create an initial shut-off.

Prepare now for any sub-surface pressure control installation by including the Type J Nipple and Flow Coupling in the tubing string. The economical installation of this tool provides a seat, or "base of operations," for the new OTIS Type J Removable Locking and Pack-off Assembly onto which may be attached any OTIS sub-surface controls.

OTIS PRESSURE CONTROL, INC.

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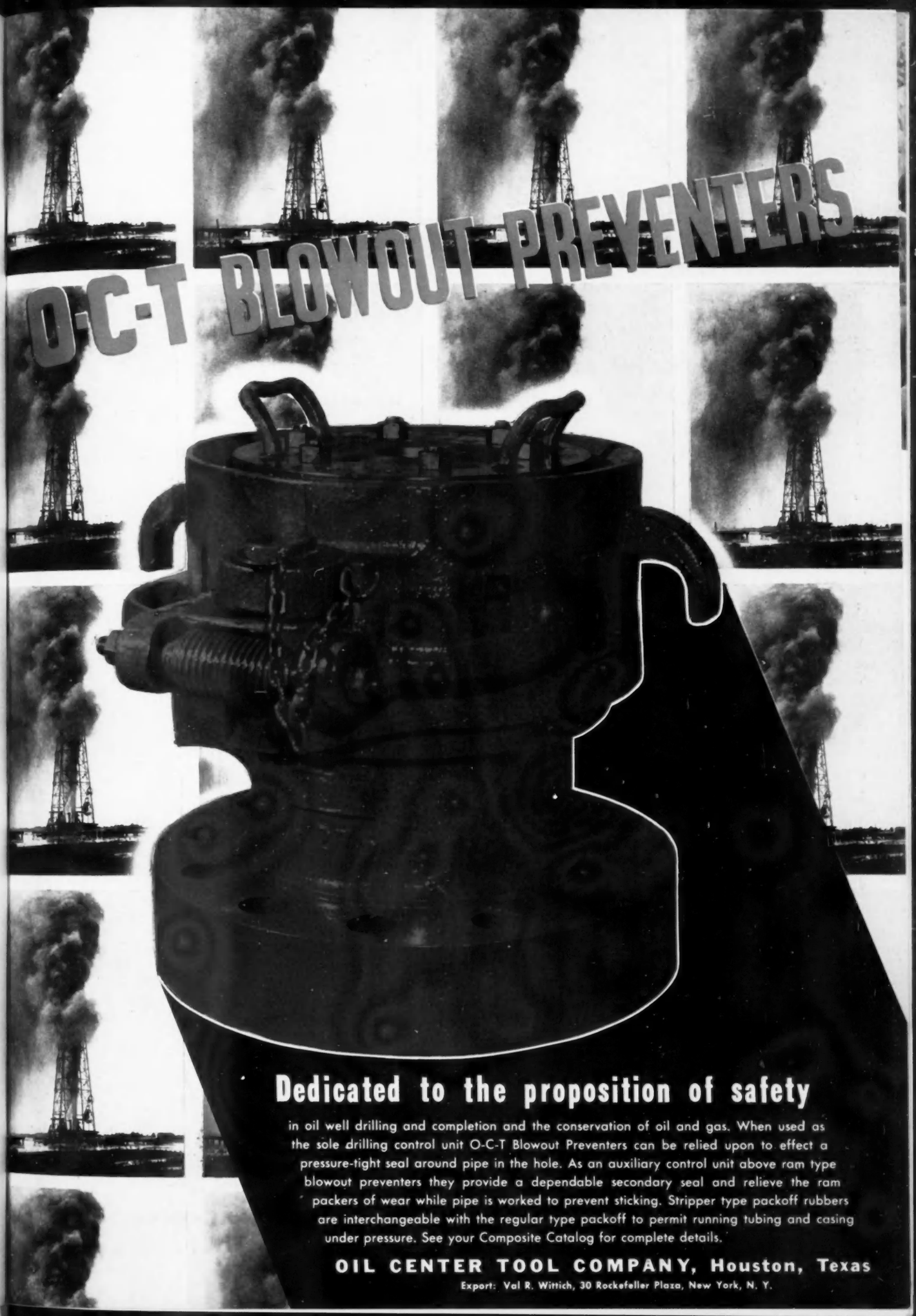
Pipe Line System Serving Fields of the Tampico-Tuxpan District



Dedicated to the proposition of safety

in oil well drilling and completion and the conservation of oil and gas. When used as the sole drilling control unit O-C-T Blowout Preventers can be relied upon to effect a pressure-tight seal around pipe in the hole. As an auxiliary control unit above ram type blowout preventers they provide a dependable secondary seal and relieve the ram packers of wear while pipe is worked to prevent sticking. Stripper type packoff rubbers are interchangeable with the regular type packoff to permit running tubing and casing under pressure. See your Composite Catalog for complete details.

OIL CENTER TOOL COMPANY, Houston, Texas

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Pump station on mountainous route of Poza Rica to Mexico City pipe line. New pumps are being installed at each of these original stations to provide larger capacity to Mexico City. Original pumps will be undisturbed and used in Poza Rica-Salamanca pipe line, partially paralleling Poza Rica-Mexico City line.

TABLE 1

Northern Zone Oil Pipe Lines

Oil Pipe Lines	ROUTES					OIL PIPE LINE		
From—To	From—To	Length of the Route (Miles)	Diameter and Length of the Route Pipe Line	Total Length of the Route Pipe Line (Miles)	Route Capacity (Bbls/Day)	Total Length of the Oil Pipe Lines (Miles)	Total Length of the Oil Lines Forming the Pipe Pipe Line (Miles)	Pumping Capacity of the Oil Pipe Line (Bbls/Day)
Poza to Atzcapotzalco	Poza Rica to Atzcapotzalco	146.9	129.0 miles of 10″ line pipe. 17.9 miles of line pipe	146.9	22,500	146.9	146.9	22,500
Poza Rica to Tuxpam	Poza Rica to Tuxpam	38.9	38.9 Miles of 12″ pipe line. 38.9 Miles of 8″ pipe line. 38.9 Miles of 6″ pipe line. 12.4 Miles loop of 12″ pipe line.	129.1	125,000	38.9	129.1	125,000
Tuxpam to Potrero (Via Ojite)	Tuxpam to Potrero	32.6	32.6 Miles of 8″ pipe line. 32.6 Miles of 8″ pipe line.	65.2	50,000	32.6	65.2	50,000
Cobos to Alamo (Ex-Penn Mex.)	Cobos to Alamo	20.5	20.5 Miles of 8″ pipe line.	20.5	25,000	24.9	24.9	25,000
Poza Rica to Tampico. (Poza Rica Crude)	Poza Rica to Alamo	34.8	34.8 Miles of 12″ pipe line.	34.8	63,000			
	Alamo to Potrero	13.7	2 lines of 13.7 Miles of 8″ & 10″	27.3	75,000			
	Potrero to Chijol (Ex Aguila)	87.6	3 lines of 8″ pipe of 87.6 Miles each	262.7	72,000	136.0	262.7	63,000
Alamo to Tampico (Ex Huasteca) Naroleo Pumping	Alamo to Tampico	102.8	1 line of 10″ and 8″ pipe of 102.8 miles and one loop of 11.2 mls. of 10″ pipe between Portrero & Cerro Azul	114.0	24,000	102.8	114.0	24,000
					Total...	482.1	742.8	

would prove necessary, the solution would have to be the construction of a new line of larger diameter.

Proposed Isthmus Line

The Isthmus pipe line has been under consideration on different occasions, and several projects for various capacities have been elaborated.

Some of these projects were intended to provide the necessary capacity for definite possibilities of exportation and others with the aim of meeting only the local needs of the Pacific Coast area of this country.

At present what seems more likely, if this pipe line is to be constructed, would be to limit the problem to the domestic needs and, therefore, the capacity of this pipe line should be of about 30,000 barrels per day of crude oil which would mean a 10 to 12-inch pipe and the establishment of a refinery in Salina Cruz. Now nothing has been decided on this subject.

Poza Rica-Salamanca Line

It is intended to build a new refinery at Salamanca, State of Guanajuato, northwest of Mexico City. This refinery will have a capacity of 30,000 barrels per day and will be mainly constructed with equipment of an existing refinery in Tampico.

To supply this refinery a 12-inch, 290-mile pipe line from Poza Rica to the refinery will be constructed with a 30,000-barrels daily capacity.

The route chosen for this line is as follows:

Starting from Poza Rica it follows

Pay off faster with oilmaster "MULTIPLE TUBE" *Fluid Packed Pumps**

*THE OIL COUNTRY STAND-BY

FOR MORE than 20 years the Multiple Tube Fluid Packed Pump has been a favorite of production men in every hard-to-pump oil field in the world. This popularity is the result of unsurpassed performance in outlaw wells throughout the oil industry. The Fluid Packed Multiple Tube Pump has from 7 to 15 times more clearance between the working parts than the conventional, all-metal pump . . . 7 to 15 times greater space for abrasive sand particles to pass through the pump without scoring the metal surface . . . 7 to 15 times more fluid cushion between the working parts to protect them against wear.

The POSITIVE PULL TYPE is recommended for general pumping conditions wherever the insert feature is desired. The entire assembly is installed and removed on the rod string.

The REMOVABLE TYPE is equipped with a manually operated hook-on device which makes removal of the standing tube and standing valve optional when the traveling tubes are pulled.

Illustration at left shows fluid packing in color. It is actually the fluid being pumped.

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Existing and Proposed Oil and Gas Pipe Lines of Mexico

This general map shows all of the existing oil and gas trunk pipe lines in Mexico and the fields, refineries, and terminals that they serve. Also shown is the projected crude line from Beristan to Salamanca, where construction of a refinery has been started. Proposed but not yet definitely planned are the crude oil pipe line from the Isthmus fields to Salina Cruz and a new refinery at the latter point.

exactly the same route as the existing Poza Rica-Mexico pipe line to a point named Beristáin, approximately 70 miles from Poza Rica.

This will allow the use, without removal, of the six existing pump stations of the Poza Rica-Mexico pipe line that will be substituted by the new centrifugal-pump stations previously mentioned.

From Beristan it will follow a more or less straight line to the refinery in the vicinity of existing highways.

Pipe Line Systems of the Northern and Southern Zones and Cacalilao-Panuco, Etc.

Northern Zone: The pipe lines of this zone can be considered constituted of five systems:

(1). Poza Rica-Atzcapotzalco, with a capacity of 22,500 barrels per day of crude from Poza Rica to the Atzcapotzalco refinery.

(2). Pipe line systems Poza Rica-Tuxpan, able to transport 125,000 barrels per day of crude from Poza Rica to loading stations at Tuxpan Bar for for export.

(3). Pipe line system Poza Rica-Tampico, with capacity to transport 63,000 barrels per day of crude from Poza Rica to the refineries and export.

(4). Alamo-Tampico system (Ex-Huasteca), able to transport 24,000 barrels per day of local production from the Golden Lane (Naranjos crude) to Tampico.

(5). Pipe lines between Tuxpan Bar

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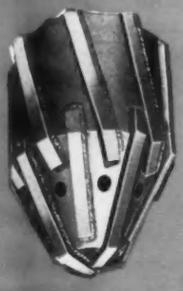
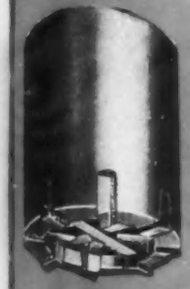
TYPE "F"

TYPE "B"



TYPE "D"

TYPE "H"



TYPE "E"

TYPE "I"

KINZBACH WHIPSTOCK

The Kinzbach Patented Whipstock has saved time, trouble and money for operators since introduction to the field 19 years ago. It has been constantly improved to meet advanced drilling methods resulting from increased drilling depths. It has changed sidetracking from an emergency measure to a normal well problem.

Through worldwide performance over a long period it is accepted worldwide as the positive means of sidetracking junk, for straightening crooked holes or establishing a new drilling course, for redrilling workover holes, for plugging back holes, and for directional drilling, by orientation.

The outstanding features of the Kinzbach Whipstock are:

1. It can be set at any desired depth, requiring no support from bottom.
2. The hinged feature insures that the top of the whipstock will lie back against the wall of the pipe at all times.
3. By setting in a coupling, the window will always be within the one joint of casing, thereby eliminating all chances of parting the string of casing.
4. Positive setting of slips prevents all turning or downward movement of whipstock at any time.
5. It can be oriented in the hole to mill out in any desired direction.
6. The whipstock can be removed from the hole, if required.
7. It is constructed of alloy steels, and the design is such that a good clean window can be cut, leaving no obstructions for subsequent drilling operations.
8. It can be arranged to trip on bottom, or in internal flush pipe where the pipe end is not exposed, such as welded pipe.

KINZBACH MILLING TOOLS

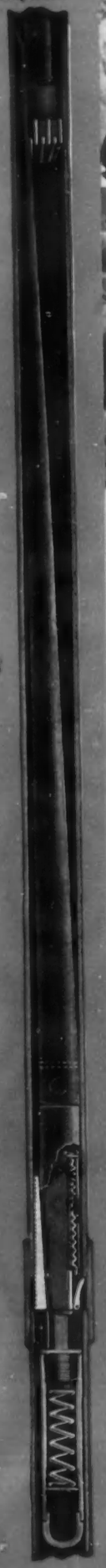
Kinzbach Milling Tools have been designed to provide the operator with the most efficient tools for the job, and have been proven in the field, assuring a clean, consistent cutting action.

1. The body is made of a high quality steel to a shape that insures the best cutting results, and with the proper size connection for the pipe above the tool.
2. The blades are made of high speed tool steel, and properly heat-treated and ground.
3. The spiral setting of the side blades gives a uniform depth of cut, eliminating much of the danger of twisting off the drill pipe.
4. Since the blades are made as inserts, the cutting edge can be properly ground to provide the most efficient cutting action.
5. These features combine to make the Kinzbach Mills particularly adapted for cutting the new alloy casing and pipe.

A great many types and designs are either found in our stock, or can be quickly produced to meet the requirements of a specific job. Seven common types are illustrated here . . . types usually carried in stock in the more popular sizes.

SEE THE COMPOSITE CATALOG FOR FULL DETAILS

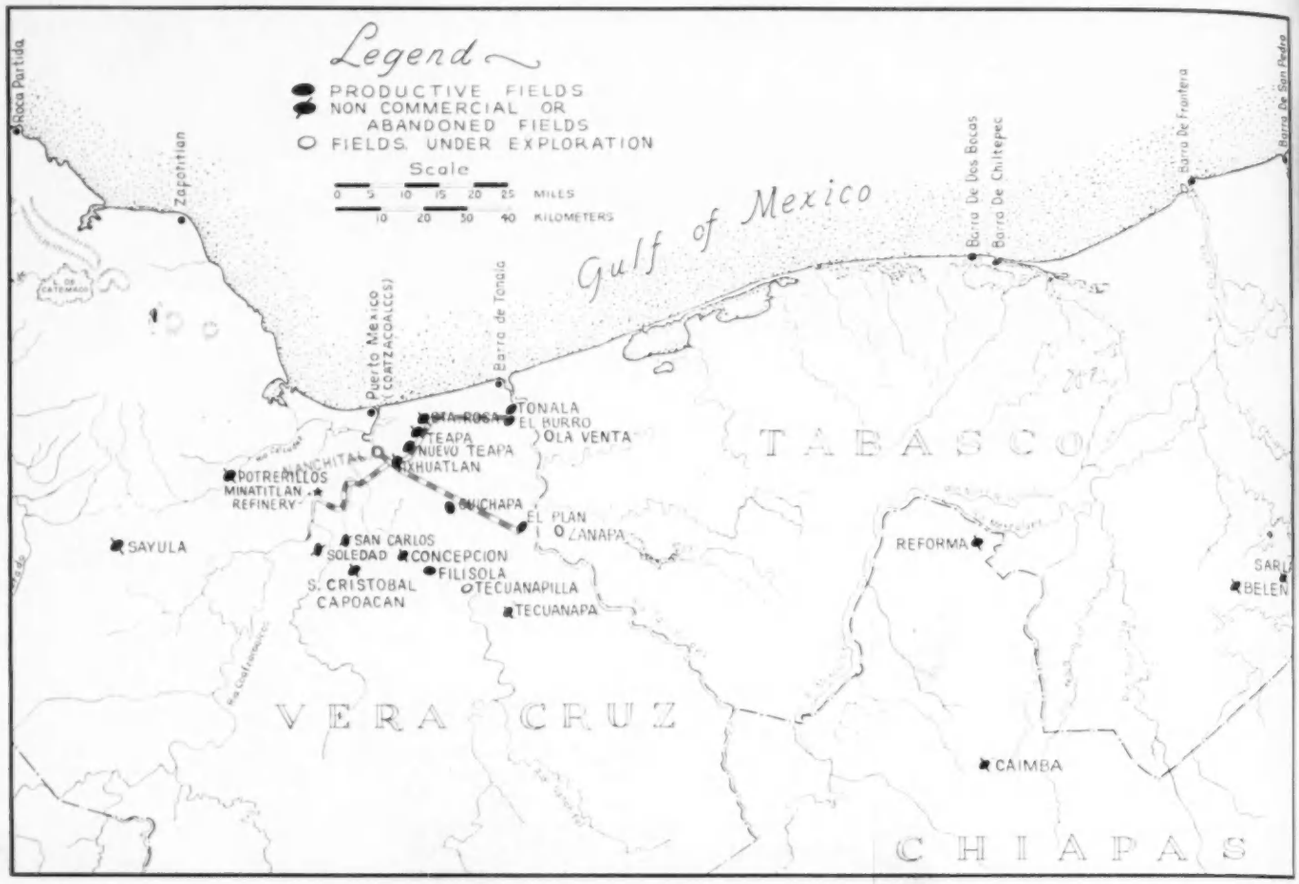
Kinzbach Patented Whipstock



KINZBACH TOOL CO., INC.
HOUSTON, TEXAS
California Representative: S. R. Bowen Company. Export Office: 74 Trinity Place, New York City, N. Y.

KINZBACH

Pipe Line System of the Isthmus of Tehuantepec, Mexico



Pipe lines deliver crude from Isthmus fields to Minatitlan refinery and to Nanchital terminal, both on the navigable Coatzacoalcos River just above its mouth at the port of Coatzacoalcos (Puerto Mexico).

and Cobos to Alamo and Potrero that allows the pumping of stocks in excess at Tuxpam Bar, to Tampico.

The detail of capacities, lengths, diameter of pipes, number of lines, etc., of these pipes is summarized in Table 1.

Southern Zone: The pipe line systems of this zone, with capacity to transport 30,000 barrels per day of the different fields' production of the zone to Nanchital for export and to the Minatitlan refinery, is shown in detail in Table 2.

Cacalilao-Panuco Zone: This system formed by the Districts of Ebano, Cacalilao-Panuco and Reventadero is formed by all the lines to transport 30,000 barrels per day of total production (Panuco crude) to the loading stations in the Panuco river and to Tampico and is shown in detail in Table 3.

As shown, the total pipe line capacity of each zone can be considered as follows:

	Bbls. per day
Northern zone, Poza Rica crude	210,000
Northern zone, Naranjos crude	24,000
Southern zone, local production	30,000
Panuco-Cacalilao, etc	
Panuco crude	30,000
Total transport capacity	294,000

The length of the pipe lines are as follows:

Northern zone	433.80 miles
Southern zone	88.36 miles
Cacalilao-Panuco zone	176.42 miles
Total	698.58 miles

Constituted by the following pipe line lengths:

Northern zone	742.95 miles
Southern zone	88.36 miles
Cacalilao-Panuco, etc.	197.36 miles
Total	1028.67 miles

TABLE 2
Southern Zone Oil Pipe Lines

Tonala-Minatitlan
Length: 35.162 Miles
Consisting of:
1— 8" line pipe, 6.656 miles length
1—10" line pipe, 19.843 miles length
1—12" line pipe, 8.663 miles length

El Plan-El Chapo
Length: 21.611 Miles
Consisting of:
1— 8" line pipe, 9.321 miles length
1—10" line pipe, 9.321 miles length
1—12" line pipe, 2.969 miles length

El Chapo-Nanchital
Length: 5.580 Miles
Consisting of:
1—8" line pipe, 5.580 miles length

Cuichapa—22 Kilometer (13.671 Miles)
Length: 3.039 Miles
Consisting of:
1—8" line pipe, 3.039 miles length

Tonala-Nanchital*
Length: 22.992 Miles
Consisting of:
1—3" line pipe, 22.992 miles
* Gasoline pipe line.

Note:—The pumping capacity of the above pipe lines is of 30,000 barrels per day of Isthmus crude oil.

TABLE 3
Ebano-Cacalilao-Panuco-Reventadero Districts' Oil Pipe Lines

Ebano District:
Consist of the following Oil Pipe Lines:
Chijol-Pumping Station H.
Main Pipe Line, consist of:
1— 8" line pipe, 5.593 Miles
2—10" line pipe, 4.661 Miles each one
1—10" line pipe, 8.078 Miles
2—10" line pipe, 16.778 Miles each one
Main Oil Pipe Line total length: 35.264 Miles
The oil pipe line branches consist of:
45.984 Miles length of 10" line pipe
24.545 Miles length of 8" line pipe

Cacalilao-Panuco District:
Consist of the following oil pipe lines:
Corcovado I-Las Delicias:
The main oil pipe line consists of:
1—8" line pipe, 24.235 Miles
The oil pipe line branches consist of:
5.717 Miles length of 10" line pipe
11.185 Miles length of 8" line pipe
1.243 Miles length of 6" line pipe
1.864 Miles length of 4" line pipe

Reventadero District:
Consist of the following oil pipe lines:
Tanantoro Pumping Station 4:
The main oil pipe line consist of:
1— 8" pipe line, 7.768 Miles length
1—10" pipe line, 4.039 Miles length
1— 8" pipe line, 2.237 Miles length
11—10" pipe line, 1.988 Miles length
Main oil pipe line total length: 14.044 Miles
The oil pipe line branches consist of:
9.445 miles of 8" line pipe
0.621 miles of 6" line pipe

Note:—The pumping capacity of the above pipe lines is of 30,000 barrels per day of Panuco crude oil.

Public Relations Section Headquarters, Services of Supply, United States Forces, China Theater.

Workers in an oil field in China were interested in Lt. Col. Charles H. Andrus, San Antonio, oil operator and petroleum engineer, and his camera, when he stopped at an installation while inspecting Kansu, Shensi and other northern oil districts, in a special survey while on ordnance duty with the U. S. Forces in India, Burma and China. (*The Oil Weekly*, June 18, 1945, p. 74.)

Oil and China's Future

By L. J. LOGAN, Associate Editor

WILL China endeavor to develop her petroleum resources herself, or will she invite the cooperation of foreign private companies as in the case of Venezuela?

While this is a question that may have an important bearing on China's future economic life, no definite answer to it could be ascertained through recent inquiries among sources in Washington which should be familiar with China's plans on the matter, if such have been made. The inquiries elicited contradictory opinions and statements that if the Chinese government has made a policy on oil development, such policy has not been revealed.

Questioning brought out, at the same time, reports that conversations have taken place between the Chinese government and representatives of foreign oil companies; that such discussions may be under way right now. One source stated that representatives of British oil interests had been seeking oil development rights in China.

Subsoil rights in China belong to the government. If the government decides to develop its own oil industry through government operation, then technical knowledge, equipment, and funds will have to be forthcoming from the United States, it is thought.

In making the inquiries, the impression was gained that the Chinese government would prefer to operate the oil industry as a national enterprise, but on the other hand it was said that the door was not completely closed to the kind of operating agreement made by the Venezuelan government with oil companies.

Regarding the prospects that American oil companies may participate in development of China's oil resources, it is significant that the Chinese people are and have reason to be strongly pro-American. Furthermore, the Chinese government agencies which have established limited petroleum production in China have done so with the important collaboration of American geologists, engineers, drilling personnel, and drilling and production equipment. They found that the men and the equipment lived up to the American reputation for proficiency in oil development.

In the United States, notes of caution have been sounded, however, with regard to postwar industrial development in general in China. At the New York meeting of the National Foreign Trade Convention recently, for example, such a warning was given by Clarence Edward Gauss, former U. S. ambassador to China. Both the government and industrialists of the United States should move slowly, he advised, in fostering China's economic plans. He suggested an examination first of the United States' own position and the actual needs of China. "We must observe," he said, "the political trends and developments in that country and the over-all development of Chinese government policy toward and treatment of our existing interest in China—in trade, industry, shipping, banking, insurance, and so on."

In extending aid to any of our Allies, the speaker said, we should "take care to determine whether we may be contributing assistance to economic forms which will threaten our own free competitive system and whether we are aiding or fostering projects which will cut

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Liner Size	Piston Area Sq. In.	DISPLACEMENT Gallons per Min.	DISPLACEMENT Barrels per Hr.	R.P.M	Working Pressure Lbs per Sq. In.	Horse Power Required	Plunger Load Pounds
4 x 12	12.57	123	176	54	1,500	118.8	18,855
4½ x 12	15.90	161	230	54	1,225	126.8	19,478
5 x 12	19.64	202	289	54	1,000	130.0	19,640
5½ x 12	23.76	248	355	54	825	131.8	19,602
6 x 12	28.27	300	428	54	700	134.8	19,789
6½ x 12	33.18	355	507	54	600	136.9	19,908
7 x 12	38.46	414	592	54	500	133.2	19,230
7¼ x 12	41.28	446	637	54	475	136.2	19,609

GASO PUMPS

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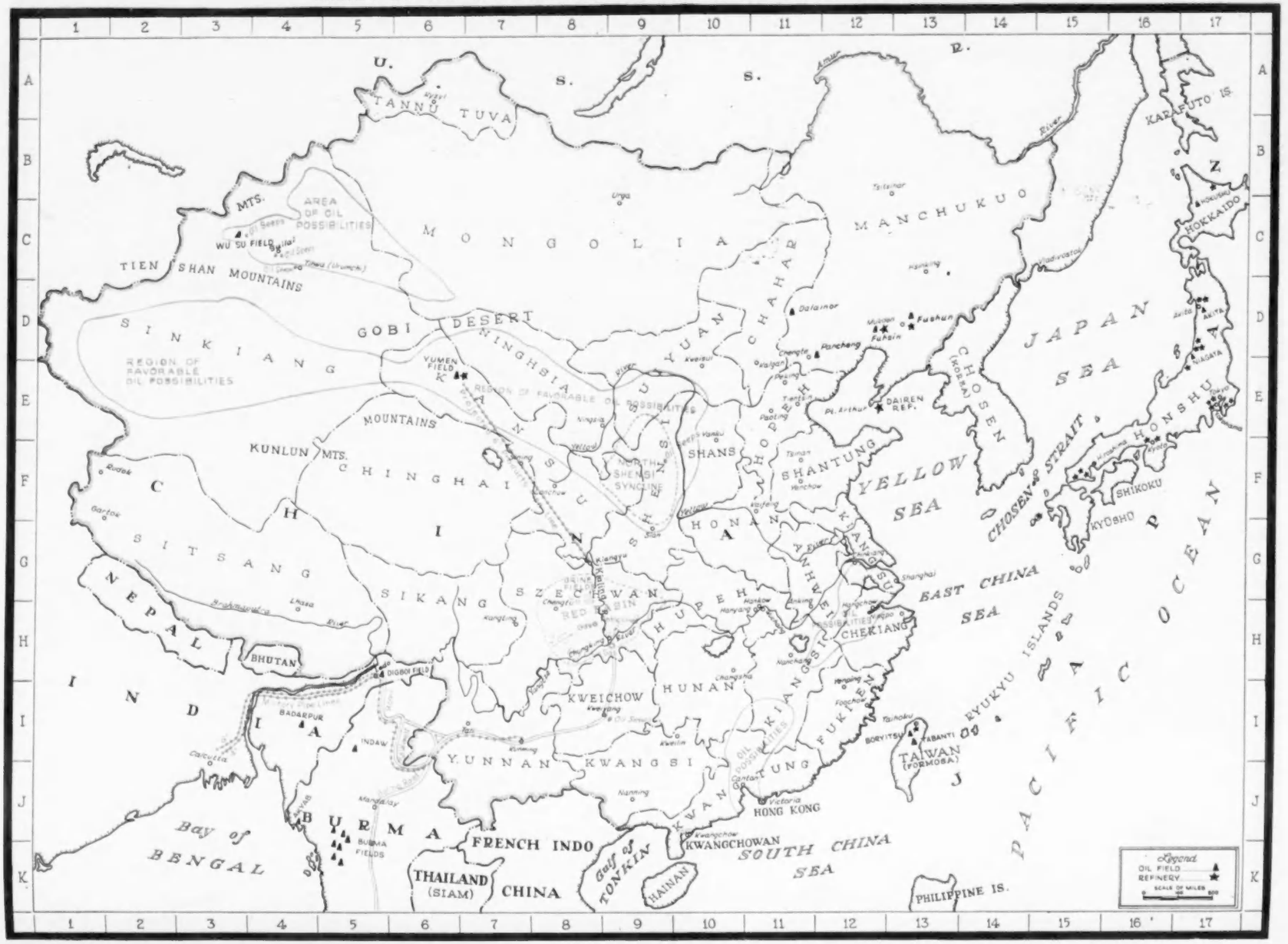
China's Oil and Gas Fields and Areas of Favorable Oil Possibilities



China so far has only two commercial-scale oil fields and two 1-well gas fields. But there are favorable possibilities for oil production in various districts, particularly in central and northwestern China, where numerous oil seeps and anticlines exist.

—Wide World photo

China needs to develop an oil industry of her own for military as well as economic reasons. In the war against the Japanese, planes of the Allies had to "fly the Hump" of the Himalayas from India into China and back without refueling, in hauling in military equipment. Here, a crew of combined operations converges upon a Curtiss C-46 Commando, just back from China, to fuel, load, and service the plane for another Hump hop.

across the lines of our own interests." However, he predicted abundant opportunity for our industry, trade, and capital in China "if and when plans for economic development can take final form."

While the above view was concerned not with any single industry but with industry in general in China, its implications are interesting and perhaps significant from the standpoint of possible American participation in petroleum development in that country.

Much Activity Ahead

Although it remains uncertain how development will be carried out, China undoubtedly will promote henceforth an active program of petroleum development, aimed at making the country self-sufficient in oil. And it appears quite likely that this aim can and will be achieved. Before the war, consumption of petroleum products was only about 5000 barrels daily, but a great deal more is expected to be used in the future, as the generally anticipated postwar development of the country proceeds.

To supply this potential demand, China has within her borders much prospective oil-bearing land, looked upon favorably by geologists. There are large expanses of country containing favorable sedimentary conditions, many anticlines, and evidences of oil. And under the pressure of war requirements, a creditable record was made in developing some commercial-scale production. Two producing fields have been established, and at one of them, the Yumen field of Kansu province, limited refining facilities were installed and utilized to advantage in prosecuting the war. As the war with Japan ended, important expansion of production and refining capacity in that area had been initiated, and plans had been completed for a long, six-inch products pipe line to deliver military-grade fuels to a river terminal above Chungking. It was contemplated at the same time that a larger refinery and another trunk pipe line would be constructed immediately after the war to make peacetime use of the oil production.

The first oil field discovery of commercial importance in China was the Wu Su field in northwestern Sinkiang province, located in a remote area of northwestern China within about 200 miles of the border of Russian Turkestan. Reports on that field have been hazy and secretive because of wartime and international circumstances, and they give the impression that oil production may have been obtained in more than one locality of the general area. One report stated that a field was opened at Wu Su in 1937 and subsequently developed into a fairly important field, although other reports date the discovery as late as 1941. The exploration and drilling were carried out by Russian engineers and crews, the reports indicated, under arrangements between the governments of China and Russia. The Russians withdrew from the area in 1941 (or 1943), according to the reports, and took field installations and equipment with them, but turned over to the Chinese about 25 producing wells that had been capped and left for future operation. The wells were said to have produced 49-52 gravity oil from depths averaging about 4800 feet, showing heavy gas flow and producing crude that yielded straight-run gasoline of 80 octane rating. While the reports do not make clear the exact location of this field, it is to the west of Tihwa (Urumchi) and near or to the west of Suilai (Manas). In that general area, at least half a dozen or more localities have oil seeps that may mark future oil fields. The seeps are in a sedimentary basin embracing the northern corner of Sinkiang province. This region offers, perhaps, some of the best oil possibilities in all China. And farther south in west central Sinkiang province is another large basin where oil may be found. Development in Sinkiang will be slow, however, because of the remoteness of the region.

China's second developed oil field of commercial significance is the Yumen field in northwestern Kansu province, between Yumen and Kiayukwan. It is far to the east and south of Wu Su production, although still to the northwest of the center of the country and about 900 airline miles northwest of the capital, Chungking. While it is less remote than the Wu Su field, the Yumen field itself is not advantageously located, being at the edge of the Gobi Desert in an area 8000 feet above sea level, far to the northwest of the more important centers of population and activity. Development has been difficult because food for workers as well as equipment and materials has had to be moved long distances without adequate transportation facilities, using rivers and trucks. Similarly, moving oil out represents a serious transportation problem.

Nevertheless, China urgently needed petroleum products for military and related purposes, and development of the Yumen area was made a part of wartime and postwar plans. The field was opened

in the latter part of 1939, and at the middle of 1945 embraced about 3000 proved acres and had 26 producing wells capable of a natural flow of approximately 21,000 barrels per day, while 14 more wells were scheduled to be drilled by the end of the year. The oil is 38 gravity, intermediate paraffine base, and comes from Cretaceous sandstone at average depth of 1350 feet. Development has been carried out by the Kansu Petroleum Production and Refining Administration of the National Resources Commission, an agency under the Ministry of Economic Affairs of China. The KPPRA discovered the field with aid of recommendations of an American geologist as well as Chinese geologists, and also has utilized the services of several American engineers and drillers in the development. Refining has been limited to a small topping plant, built under serious difficulties and shortages, and the gasoline made in it has been trucked 400 miles to Lanchow. However, construction of a 1500-barrel per day thermal cracking unit was under way in the field as the Japanese war ended, and it was due to be completed by the end of 1945. Meanwhile, plans were going forward for laying by the end of 1946 a 900-mile, six-inch military products pipe line from the refinery to the river port of Kwangyuen on the Kialing river 200 miles north of Chungking. It was contemplated that high octane and medium grade gasoline, kerosine, and light fuel oils would be moved through the line to Kwangyuen and thence by river barge to Chungking for military and industrial use in southeastern China. The refinery and pipe line represented a wartime emergency project, and plans called for construction of a larger refinery and another trunk pipe line immediately after the end of the war.

Additional Fields

The Yumen field is on the northern slope of the Nan Shan range of mountains, and long-known oil seepages led to its discovery. Its importance extends far beyond its individual potentialities, as it points the way to possible additional fields over a large basin extending from northwest to southeast into eastern Kansu and northern Shensi provinces. That basin skirts the Nan Shan mountain range on its north side and is crossed by the Great Wall. Especially promising is the area centering around the eastern corner of Kansu province and the northern portion of Shensi province, where oil seepages are known, including some near Yenan in Shensi. Any production developed in the latter region would be more advantageously located than the present development near Yumen.

Another region of favorable oil possibilities in China is the Red Basin, embracing the eastern third of Szechwan province, the city of Chungking being in the central southern portion of this basin. Any oil fields opened there would be very advantageously located. That basin was described in detail by Marvin Weller, American geologist, in THE OIL WEEKLY of April 3, 1944. In that basin are many anticlines and many brine wells that have yielded small amounts of oil and gas from Cretaceous, Jurassic, and Triassic formations at shallow depths, although the best possibilities for production are believed to be offered at greater depths in the underlying Permian and perhaps Ordovician and Cambrian formations. Interest in the possibilities of the region has been stimulated by discovery of two 1-well gas producing areas in the general area of Chungking. Late in 1943 a well was completed four miles southwest of Chungking as a gas producer of 1200 pounds pressure per square inch from lower Triassic limestone at 3300 feet, on surface indications of structure and oil. The gas production has been used to fuel ferry boats across the Yangtze River at Chungking. The rig used on that well was moved 60 miles northward to another structure marked by oil seepages and again gas was struck in the Triassic and a high pressure gas producer was completed in the spring of 1944.

Other Areas

In addition to these more promising regions, China has oil possibilities also in some other areas, as evidenced by oil and gas seeps as well as geological conditions. In Kweichow province, adjoining Szechwan province to the south, there are oil-impregnated beds of Permian-Triassic age at Poumuchung village ten miles southeast of Kweiyang. In the east coast province of Chekiang, below Shanghai, a flow of oil from a sandstone lens of Permian age was discovered under a coal mining shaft about 12 miles west of Changshing city. Seepages and other indications of oil and gas throughout the above discussed districts of China were described in considerable detail in THE OIL WEEKLY's World Survey number of March 18, 1935.

Even in the most promising areas of China, drilling has been very scant. Therefore a great deal remains to be learned about the geology of the country, and every deep test will be of great significance.

In the early stages of the development of an oil industry in China, it is to be expected that effort will be expended mainly in the more promising regions around the present proved production. If the gas discoveries in Szechwan province lead to important discoveries of oil, the building up of the industry will be much facilitated, because that area is more readily accessible and near to potential important domestic markets. But such developments as those farther northwest in western Kansu and Sinkiang provinces will be difficult because of remoteness from supplies and transportation problems. And petroleum developed in those remote areas would give rise to the further difficult problem of transporting and marketing the oil. Major pipe lines would be required for handling any substantial volumes of crude or products, although they might extend only to points on the navigable rivers, with oil moving thence toward the coast.

Modern economic development within China would promote domestic consumption of petroleum products and provide market for oils that might be made available, and the oil would contribute in turn toward the general economic development.

China unquestionably must make the most of her favorable oil possibilities if she is to achieve the maximum development of her economy, and the government must decide whether this development of a vital industry can be done best by government operation and monopoly, by private enterprise and competition, or by some compromise or combination.

That an adequate oil industry is literally vital to China's welfare is attested by the difficulties that confronted the country during the war by reason of not having enough petroleum. This shortage of oil was spotlighted by its partial solution through the building of military pipe lines from Calcutta, India, through India and Burma to Kunming, China. Because the Japanese had blocked off the Burma Road in Burma, supplies were moved in to China from India. For that purpose the Stillwell or Ledo road was built in northern India and Burma to join the Chinese section of the Burma Road, and partially portable military pipe lines were built from Calcutta to Kunming, up the Brahmaputra valley and along those roads, a distance of nearly 2000 miles. From Calcutta to Ledo a four-inch and a six-inch line were laid, and one of them was extended on to Kunming to make the longest pipe line in the world, the route attaining a maximum altitude of about 9000 feet after starting from sea level. The lines were built under extreme difficulties with the combined manpower and resources of the United States, England, India and China and were in operation the full route before the Japanese surrendered, bringing in oils that originated mostly in the Middle East. For China they represented, however, a difficult means of obtaining oil which should not be necessary in the future.

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Germany's Oil Poverty

Baring one of the war's best-kept secrets: The exact status of Germany's oil industry

By DR. J. BRIAN EBY, Consulting Geologist

AMONG the most serious and urgent problems to come out of this war is that pertaining to the handling and disposition of the German industrial and commercial economy. The future peace of Europe devolves largely upon a wise and firm policy. The position of the oil industry is definitely one of vital interest and a discussion of its particular problems is most opportune.

One of the war's best-kept secrets was the exact status of the German oil production and what was happening to it during the years of fighting. Many rumors of new and startling discoveries were heard but the facts can now be revealed. Several new fields were opened but the national output which rose to a peak in 1940 declined steadily to the present time.

To meet war needs the German's exerted great efforts to find new fields and increase the flow from known fields. In the case of Reitbrook near Hamburg, they dangerously, if not disastrously, depleted the field by too speedy production. Despite the most untiring efforts, the discovery of new reserves did not by any means keep the annual production from declining during the later years of the war. The actual production figures for 1939 to 1944 inclusive are given in Table 1. A map of the oil and gas fields of North Europe will appear in a later issue.

1938 Status

Before considering the present and future situation it is necessary to examine the status of 1938. In that year Germany produced from the ground 552,074 tons, made synthetically 1,250,000 tons, from tar oils, benzol and alcohols 950,000 tons, and imported 4,960,000 tons. This was a total oil accumulation of 7,712,074 tons.

During this same year, the country consumed a total of 6,600,000 tons of petroleum products for a daily average of 126,600 barrels. It is estimated that of the 1938 total consumption, 3,100,000 tons were used for various military purposes and 3,500,000 went into commercial uses. Breaking these figures down still further, the total 1938 consumption was divided as follows: 51.9 percent road transport, 23.8 percent industry, 4.9 percent agricultural, 12.7 percent bunkers, 3.1 percent household, 1.3 percent railroad, 1.9 percent inland waterways, and 0.4 percent miscellaneous. The foregoing products were divided into 49.2 percent gasoline, 2.4 percent kerosine, 8.1 percent lubricants, 24.4 diesel oils, and 15.9 percent fuel oils.

Since military uses of petroleum products by the Germans can now be eliminated from the picture, the average an-

nual prewar commercial useage of petroleum products could be stated to be about 3,500,000 tons (about 24,500,000 barrels, this is a prewar average of about 2,041,000 barrels monthly.)

The present situation can be inferred from the crude oil record for October, 1945. In that month the Hannover district produced 41,010 tons, the Heide district 7785 tons, the Dutch Border area 4406 tons, and the Hamburg area 3375 tons. The total October production of crude was 56,576 tons, which would indicate an annual production rate of about 678,900 tons (4,752,000 barrels). As will be seen from Table 1, this is a decline from 1944.

In order to handle the vast problem of economic recovery in Northern Europe the Allied governments have various joint commissions that meet periodically in Berlin. The Office of Military Government for Germany (U. S.), for example, has established the Economic Division, under direction of Brig. Gen. W. H. Draper, Jr., for the control of all matters pertaining the economic developments here. The Industry Branch of the Economic Division under Col. James Boyd, director, controls the development of minerals, of which oil forms an important section. The Oil Section is headed by Philip Clover, a well-known American oil man who served during the war as U. S. petroleum attache in South America.

The immediate problems of the oil industry are handled by a quadripartite committee, composed of one member each from United States, Great Britain, Russia and France. Clover is the American member. This committee establishes oil policies, recommends new policies or changes in program, and each member supervises the implementation of the oil policies in his zone.

At a recent meeting of this committee the following forecast for 1946 for German civilian use of petroleum products was made:

Dr. Eby Surveys Germany's Ruins

Dr. Eby of Houston, consulting geologist and geophysicist, currently on an inspection trip of England, Germany and other European countries for *The Oil Weekly*, was given special permission by the director of the Economic Division of the Control Council to make a close survey of German war ruins.

Dr. J. Brian Eby

"We here in the Control Council are very glad to have had Dr. J. Brian Eby visit Germany and to give a picture through the columns of *The Oil Weekly* of the destruction in Berlin and other German cities and of the economic breakdown that Hitler and the Nazis brought upon their country," Brig. Genl. W. H. Draper, Jr., GSC, director of the Economic Division, said in a formal statement.

"The destruction of plants and machinery is not nearly as great as appears on the surface. However, it is true that no more than 25 percent of the plants are operating at all and production is only about 5 percent of capacity. This is due primarily to lack of coal, raw materials and transportation.

"The American policy is to eliminate the manufacture of synthetic oil in Germany as a war potential and to greatly reduce the heavy industries by moving a large part of them to other countries in the form of reparations. The impact will necessarily be severe and will tend to build up the heavy industries of the surrounding countries entitled to reparations.

"American business men will, I am sure, realize that shortage of transportation, housing and food itself are so severe that visits to Germany cannot yet be encouraged."

This is the first of a series of articles to be written by Eby, a former newspaper man, who represented *The Oil Weekly* at the International Petroleum Congress in London in 1933 and who has published a number of treatises relating to the geology, production and economics of European oil fields. He is regarded as a particular authority on German petroleum resources.

Estimated Requirements All Germany for Year 1946
(All figures are metric tons)

PRODUCT	USSR	British	French	United States	Total	
Gasoline	180,000	240,000	30,000	120,000	570,000	
Diesel	420,000	360,000	33,600	156,000	969,600	
Kerosine	8,000	36,000	12,000	48,000	104,000	
Lubricants	60,000	45,000	21,600	36,000	162,600	
S. B. P	.....	26,000	12,000	12,000	50,000	
Wax	.....	.....	2,400	3,000	5,400	
Asphalt	60,000	60,000	18,000	30,000	168,000	
Fuel Oil	.....	.....	3,600	.....	3,600	
Vaseline	.....	.....	240	.....	240	
Total	728,000	767,000	133,440	405,000	2,033,440	(14,234,080 bbls.)

From the foregoing it will be seen that the 2,033,440 ton estimate is considerably less than the civilian useage of 3,500,000 tons for 1938. The 1946 estimate is based solely on the products needed for insurance of public utilities, health and necessary services. As is to be expected, there is severe gasoline rationing here and so-called pleasure driving by Germans is non-existent. Since the final policy for the future of German industry is yet to be unfolded, the foregoing 1946 estimate does not allow for any increased use of petroleum products above the present usage for public safety and health and recognized essentials. Any clarification of Allied policy that might lead to a substantial renewal or rebirth of German industry would require new demands of petroleum products not considered in the 1946 figures.

Synthetic petroleum manufacture was one of the chief sources of motor fuel during the war, but the Allies have frowned on its continuance, as being a real war potential. A few partially bombed-out units are operating on brown coal in the Russian zone, as an emergency stop-gap, but it seems inevitable that Germany must import the chief part of her petroleum necessities, if she is to have any oil.

1946 Import Needs

Import requirements for 1946 will be somewhere between 500,000 and 1 million metric tons, depending on what figure the Russian zone synthetic production happens to reach—600,000 tons is the most optimistic Russian estimate. If 800,000 tons of petroleum products must be imported (an acceptable guess) and it costs, say, an average for all products of $25 a ton, cost, insurance and freight, Germany, some $20 million must be made available in foreign exchange.

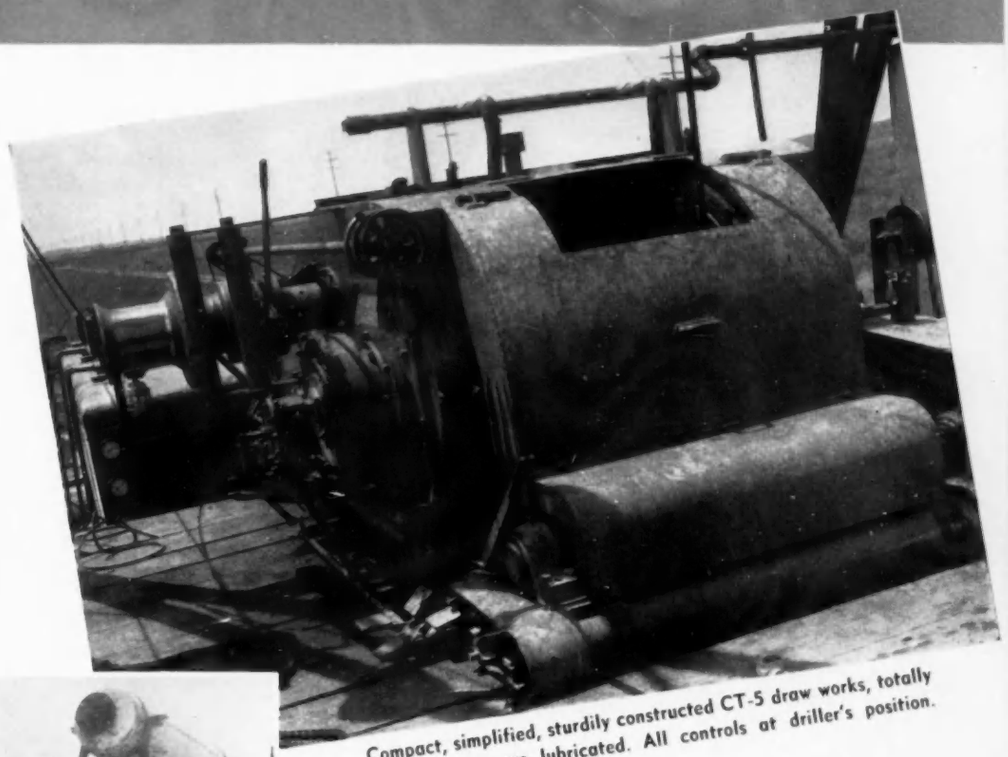
The real problem, then, becomes the provision of the money. Exports are limited, first as to exportable products, and second as to markets. Until both of these questions are solved the petroleum industry in Germany will be unable to orient itself. This problem is now being considered by the Allied Control Commission, as a part of the current deliberations.

The roll of the major and minor oil companies of the Allied world in the past war was brilliantly carried out. They pooled their knowledge, their facilities and their men for the common cause; and there is every indication that they are continuing to do so. The oil business of North Europe is certainly one of the most vital industries and its direction and handling may well serve as a guide to other industries and a barometer for the future of Europe.

95 Percent Ruins

No one who has not seen for himself the ruins of Europe's cities and towns can possibly comprehend the tragedy of destruction here. In Berlin alone, 25,000 buildings have been totaly demolished, 18,000 must be razed, and 50,000 repaired out of a total of 220,000 buildings in the city. In a five-mile diameter circle from the center of the city destruction is 95 percent complete, which includes practically all of the famous

POWER to SPARE



Compact, simplified, sturdily constructed CT-5 draw works, totally enclosed, pressure lubricated. All controls at driller's position.

Power take-off of the three Waukesha engines through the Portable Rig dual engine drive. Third engine is connected to dual pump drive. All three engines may be compounded to draw works or pumps.

●

Equipped with three Model 6-WAKU Waukesha engines developing a total of 549 rated horsepower, and compounded in such a manner that the power of any one, two, or all three engines is available at will to draw works or pumps in any combination, the CT-5 gives you "Power to Spare".

8,700 feet with TEXAS IRON WORKS' 6,500 foot CT-5 PORTABLE RIG!

The conservative rating applied to this low cost, highly efficient Portable Rig was pointedly demonstrated recently, when Bilbo-Redding Drilling Co., Ltd., drilled to a total depth of 8,700 feet, with 4½" OD, 16.60# drill pipe.

The "Power to Spare" which enabled the Model CT-5 to deliver this superb performance is the result of the numerous advancements in design and construction we have pioneered and developed for low cost, high speed, highly efficient drilling with portable rigs. Such draw-works features as hydraulic friction clutch control of both drum and rotary; transmission with four forward and three reverse speeds, plus additional fifth high speed drive direct to drum; patented water cooled braking system; machine cut, heat treated sprockets; multiple width, heavy duty roller chains; heavy duty roller bearings throughout and centralized control exemplify the fine features to be found throughout the entire rig. This model CT-5 rig was equipped with hydromatic brake.

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PORTABLE RIG

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office and government buildings of the city. Five thousand bodies still are buried in a mined subway.

Cassel, a former locomotive and automobile city of 250,000 was bombed by the RAF in retaliation for Coventry and it is estimated that half the entire population was destroyed with the city. The bodies remain in the debris. At Heilbronn, 25,000 bodies are still enclosed by the ruins of the town, of which every house is destroyed. Frankfort-on-the-main has 7½ million tons of rubble to remove before rebuilding can be considered.

Long Trail Back

The economic recovery of Europe will be a slow and painful task. American business ventures in Europe for years to come can hardly expect to receive dollar-dividends, because of foreign exchange difficulties. This applies to the oil business as well.

There is no doubt that the German people welcomed the close of hostilities and appreciated General Eisenhower's efforts to alleviate the sufferings of the overrun and conquered populations. Practically nothing has yet been done towards rebuilding the cities and towns of North Europe. The first concern of the moment is food and clothing. Rebuilding will take many years. It will take a wise and firm policy to bring order out of the shattered and confused economy of Europe.

Oil Section Chief

Philip Clover, American oil man who served during the war as U. S. petroleum attache in South America, heads the important Oil Section, Economic Division, of the Office of Military Government for Germany.

Russia in Hungary

The future of the fairly important oil industry of Hungary is involved, like that of Roumania, in the postwar plans of Russia. Although Hungary is under a joint U. S.-British-Russia control commission, Russia has sought independently to make a 5-year trade treaty with Hungary, which would permit Russia to buy up to 50 percent interest in key Hungarian industries. The U. S. joined Great Britain in protesting the proposed treaty, which would give the Soviet government dominance over Hungary's economy, but Russia contended she was within her rights in making the unilateral arrangement.

Conversion Factors Used in This Report

Basis:—One metric ton of 1000 kilograms is divided by the volume of one barrel (159 liters) multiplied by the density of the oil at 60° F. (15.5° C.). This reduces to the factor of 6.3 divided by the density of the oil.

Product	Bbls./Metric Ton
Propane	12.4
Butanes	11.0
Natural Gasoline	9.16
Aviation Gasoline	8.5
Motor Gasoline	8.5
Motor Benzol (90 percent)	7.2
Ethyl Alcohol	8.0
Methyl Alcohol	8.0
Kerosine	7.9
Diesel Oil	7.2
Lube Oils	7.0
Residual Fuel	6.5
Paraffin Wax (a)	7.5
Asphalt	6.0
Synthetics (b)	8.0
Shale Oil	7.0
All products average (b)	7.5
Crude Oils (c)	7.0

(a) The factor of 7.5 bbls./ton of wax appears to be the best figure for the wax dissolved in oil. The density of solid wax varies with the melting point from about 0.88 to 0.95, and averages about 7.0 bbls./metric ton.
(b) Does not take into account liquefiable gases.
(c) Gravity of crudes vary considerably. In view of the variation from field to field it usually will be preferable to use field gravities when available.

Many Tarakan Oil Wells Survive War's Attacks

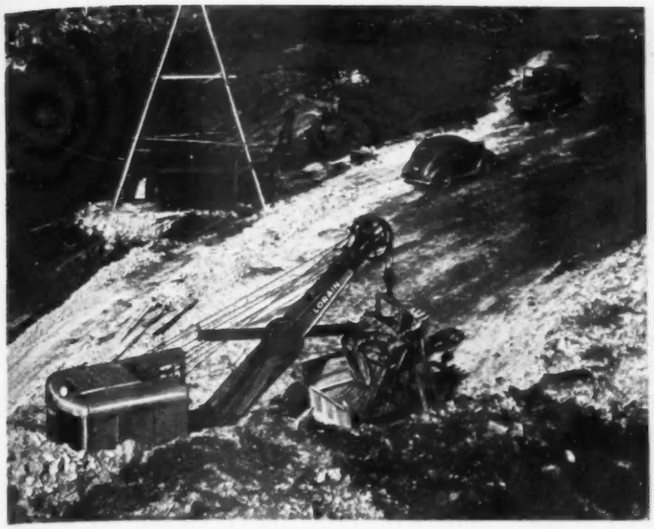
Oil production in the Tarakan fields off Borneo, first territory in the Netherlands Indies to fall to the Japanese, has been resumed on a limited scale, the Batavian Oil Company has reported. No estimate was made for 1945 output, because full scale production is impossible due to destruction of field equipment and storage facilities.

When the Japanese invaded Tarakan in January, 1942, the Dutch garrison destroyed most of the wells and tanks. During Japanese occupation, American bombers struck the fields. The Japanese attempted to follow a "scorched earth" policy when the island was invaded by the Allies this year. However, an examination revealed that one-third of the wells in the Pamusian area were not destroyed, and almost half the new wells bored by the Japanese were in operating condition.

In 1940, crude oil production amounted to 807,821 long tons, but dropped to 698,284 in 1941. Drilling was continued throughout 1940 because of the demand for oil but lack of cargo space limited production in 1941. The company noted that despite the Dutch destruction and American bombing, the Japanese succeeded in operating the wells and even drilled 140 new wells.

TABLE 1
German Production By Years
(In Barrels)

	1939	1940	1941	1942	1943	1944
Alte Piccardie (Georgsdorf)						17,178
Broistedt	6,510	5,376	6,881	31,535	25,907	17,857
Coevorden					35,000	105,000
Delum (Lingen)				1,358	42,364	134,036
Ebra	378	21,840	11,970	7,616	5,663	2,709
Eickeloh (Hademetorff)				2,800	32,697	70,938
Emlichheim						21,119
Epenwoehrden (North)						
Epenwoehrden (South)						
Etzel					12,614	21,973
Fallstein						
Feldbergen						
Fuhrberg	13,342	89,313	197,841	321,762	360,157	409,920
Gifhorn	21,714	29,050	25,270	20,636	22,687	21,252
Hambuehren					7,959	15,547
Heide	586,901	1,610,994	1,446,921	990,150	809,844	842,940
Hemmingstedt						
Hemmingstedt-Kanzlei						
Hohenassel					8,036	104,111
Hope-Lindwedel (Adolphaglueck)	500					
Linden (Near Hannover)						
Mackelfeld	32,102	42,539	43,200	49,210	35,595	32,011
Meldorfhafen						
Ebelme	65,387	62,062	49,280	74,963	92,173	100,681
Hienhagen-Hasaigsen Obershagen-Eichligen	2,519,622	2,219,952	2,195,844	2,050,629	2,029,195	1,751,701
Oberg	101,507	119,028	115,598	111,874	106,092	79,275
Oelheim-Berghoeppen-Odesse	46,116	40,012	30,905	42,336	29,829	27,909
Reitbrook	1,341,291	2,500,547	1,473,325	728,182	368,984	251,979
Rhine Valley (Baden, Weingarten, Forst)	104,146	68,775	60,130	66,661	71,631	59,751
Rodewald	150,752	281,309	359,030	334,460	372,498	374,731
Schoeningen						
Sottorf	8,197	11,046	5,404	2,254	868	644
Tegernsee (Bavaria)						
Thoeren				88,214	172,333	156,779
Volkenroda (Thringia)						
Westerholz (Wesendorf)					79,331	239,987
Wienhausen				93,268	8,596	784
Wietze	286,916	264,355	261,310	253,204	247,828	225,393
Total	5,285,381	7,366,198	6,282,969	5,271,112	5,005,819	4,980,115



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those operating in this country, plus other special problems such as those involved in transportation and communication," he said.

"A late development is the plan for the use of large cargo planes to fly heavy drilling equipment over the mountains to the fields located in otherwise inaccessible interior.

"There is need for additional technicians in all fields; civil engineers, petroleum engineers, and others and geologists to carry on the big programs for the next few years."

Another phase of Power's trip was his conference in Caracas with Dean S. S. Steinberg of the University of Maryland College of Engineering, in regard to the Pan-American Congress to be held next year under the auspices of the South American United Association of Engineers.

Trinidad Development Shows Upped Production

Trinidad Petroleum Development Company, Ltd., through its chairman, Kenneth A. E. Moore, has reported a slight increase in oil production for the company during the past year. The company's output now is about 800 barrels daily with the production for the past year totaling 2,863,080 barrels or some 40,000 barrels more than in the previous year.

During the year 16 wells were drilled with a total footage of 68,333 feet. Moore pointed to increased drilling costs, citing that it now costs twice as much per foot to drill as compared with 1939 costs.

The company now operates 37,665 acres, an increase of 2663 over its prewar acreage. A new seabed area off the south coast of Trinidad has been offered by the government and accepted by the company.

Oil-Field Houses From Wooden Barges

The sale of 59 unassembled wooden pontoon barges to the Anglo-Iranian Oil Company for a housing project has been announced by Thomas B. McCade, Foreign Liquidation Commissioner.

The barges, originally intended for use in facilitating unloading procedure in undeveloped ports, were in an unassambled state and the Anglo-Iranian firm will use the lumber from the barges for a housing project.

Correspondent Reports Huge Increase In Russian Petroleum Production

Russia's foreign oil policy is fast taking shape, its broad outline seemingly being based on a widespread and well-planned scheme, a Central European correspondent of *The Petroleum Times*, published in London, declared in a recent article on "Russian Influence and Strategy in Central European Oil."

Within the space of a few months the Soviet Union has acquired strongholds in Central and Eastern European oil resources stretching like a semi-circular chain from Roumania over 450 miles to Hungary, thence over another 160 miles into Austria, and farther for some 1000 miles to Estonia upon which the northernmost link of the chain is pivoted.

Estonia, having been an integral part of the Tsarist Empire and reunited with Russia about a year ago, is now a matter of purely Russian concern so far as its industry is concerned, the correspondent wrote. The Estonian shale oil production soon will be reaching twice the prewar rate if Soviet expectations materialize, he declared.

"The major part of the 'chain'—or of the 'advance bulwarks'—of oil cover the Danubian area, with Russia's deepest oil field penetration so far being into that of Zistersdorf," the *Times* writer said.

"There appears to be a gap in the chain between Zistersdorf and the Baltic," he said, "with Germany's oil fields being in the British zone of occupation. While, however, nothing definite has yet been revealed on the subject of restoring German oil plants in American, British or French zones, a new factor comes to light recently by the Russian support being given to German plans for setting up what seems to be a completely integrated synthetic oil industry in the Soviet-occupied zone of Germany."

The correspondent declared that in the realm of natural oil resources alone the USSR has now doubled her prewar output to more than 70,000,000 tons annually, if her hold on oil production of the Danubian States is included.

Soviet Russia's deepest test for oil is nearing its projected depth of 3800 meters (12,464 feet). The test, located near the village of Goussany, on the Apsheron Peninsula in the east Caucasus, at last report, was drilling below 3700 meters (12,135 feet).

New Refinery Would Up Supplies for Australia

A new firm is to be organized which will give Australia another refinery, according to announcement by Prime Minister Joseph Chifley. The new organization, to be known as Bitumen and Australian Oil Refineries, Ltd., would be organized by California Texas Oil Company (jointly owned by Standard Oil Company of California, and The Texas Company) on the condition imposed by the Australian government that the California-Texas Company would only subscribe 40 percent of the stock, the remainder to be made available to citizens of the country. Capital stock as proposed would amount to 1,250,000 pounds, or $5 million, and another condition would be that the new refining company import all raw materials on a sterling basis, with no operations involving dollars.

Supply of raw materials for the refinery are expected to come from the Persian Gulf area, and output of the refinery is expected to bring the country to the point where it will be independent of other countries as far as bitumen and lubricating oils are concerned, according to David Craig, proposed as manager of the new organization.

The California Texas Oil Company, Ltd., although owned by American companies, is registered in the Bahamas.

Oil Reported Discovered In Upper Part of Austria

Discovery of crude oil deposits at Pergern in the American-controlled zone of Upper Austria was recently announced by the Paris radio.

The report said that widespread drilling operations would be started shortly and petroleum experts predicted an annual output of 200,000 tons, Pergern, a railway junction 18 miles southeast of Linz, lies on the Steyr River and on the fringes of the Wels Heath, which has yielded quantities of natural gas.

The possibility of the existence of a subterranean link between the Wels Heath gas and the newly discovered oil reserves at Pergern (foothills of the Alps), cannot be excluded, the radio reported.

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Sees War Over Middle East if Big 3 Do Not Come to a Full Understanding

The Middle East Oil reserves, "the greatest prize in human history," will eventually lead to World War III unless the United States, Russia and Great Britain come to an understanding of live and let live, Colonel John H. Leavell, Tulsa financier and oil man who has been advisor to the State Department on Middle East oil policy for nearly three years, warns.

Colonel Leavell, who retired recently from the United States Army, based his warning on four years experience during World War II, during which he traveled more than 100,000 miles for the War and State Departments in the Middle East. He volunteered early in 1942 and eventually was loaned by the Army to the State Department as African and Middle East advisor on petroleum and natural resorves.

He termed the vast Middle East oil region as "where the British empire and Soviet Russia meet," and urged that the United States' foreign policy be "as friendly to Russia as to Great Britain."

Unless great nations come to an understanding the next war will occur within 35 years, Colonel Leavell predicted.

"And there is more than a possibility that the United States will be drawn in—to be used as a cat's paw—by the imperialistic nations of Great Britain and Russia," he declared. "There is more than a possibility—virtualy a certainty."

He said the United States should not approach Russia arm-in-arm with Britain.

"We should not be in partnership with either Britain of Russia," he said. "We should be in partnership with ourselves and get along with the rest of the world and to do so we must have a strong and independent foreign policy."

Discussing the proposed treaty with Great Britain, he said that "if allocations are made or based on present facilities they would be ruinous and would prevent American nationals from developing their facilities and markets all over the world."

He pointed out that less than 30 oil fields had been found in the Persian gulf area and they had proven or strongly indicated reserves in excess of 30 billion barrels, exclusive of gaseous hydrocarbons, with only one-half of one percent of favorable territory developed. It is reasonable to assume, ultimately, this area will produce 3 or 4 hundred billion barrels of oil, he said.

"I believe," he said, "that within years the world will be consuming 10 to 12 million barrels of oil daily. The bulk of the increase—over today's 6 to 8 million barrels—must come from the Middle East."

Faster International Service Planned

Transcontinental & Western Air, Inc. has set up an international division to have charge of the operation of its new over-ocean service. A fleet of "Constellations," one of which is shown above, will be put into service soon with the new fast planes cutting from 9½ to 11½ hours off present commercial transatlantic schedules to Europe. Traffic appointments to the new international division, with offices at Paris, Rome, Geneva, Cairo, London, and Dublin, have been announced by T. B. Wilson, managing director of the division. The sample elapsed time schedule from New York to Colombo calls for stops at Gander, Shannon (14 hours, 35 minutes), Paris (18 hours), Geneva, Rome (23 hours, 15 minutes), Athens (26 hours, 45 minutes), Cairo (30 hours, 25 minutes), Lydia, Basra, Bahrein (38 hours, 40 minutes), Bombay (46 hours, 5 minutes), Colombo (50 hours, 50 minutes). Wilson says that "cutting the time of present trans-Atlantic schedules by more than 40 percent will permit a substantial reduction in fares."

South America Expansion Is Planned by Braniff

Direct air routes between Houston and South American points is the plan of Braniff Airways. The firm now is waiting decision of the Civil Aeronautics Board on its Latin American applications which will give Houston direct connections with Colombia, Venezuela, Brazil and Argentina by way of Merida, Mexico, and the Panama Canal Zone.

At the Canal Zone the routes would divide, with one leg going to the northern coast of South American, the islands of the Caribbean, including Cuba, and return to Houston. The other leg would proceed south from Panama to Rio de Janiero and Buenos Aires.

Decision on the application to the Civil Aeronautics Board for the acquisition of its Mexicon affiliate, Aerovias Braniff, S. A., by Braniff Airways is also expected soon.

Conferences on Meeting of South American Engineers

Important studies in reservoir engineering are being carried on in Venezuela, Professor H. H. Power, chairman, Department of Petroleum Engineering, University of Texas, Austin, said on his recent return from a two-month visit to that country.

"The reservoir engineers in Venezuela are giving serious attention to pressure maintenance and water injection problems where conditions are favorable," he said.

Power went to the South American country as a special consultant for the Mene Grande Company of Venezuela, a Gulf Oil Corporation affiliate.

"The problems of the Venezuelan oil company entail all those which face

The OIL WEEKLY
Monthly International Section

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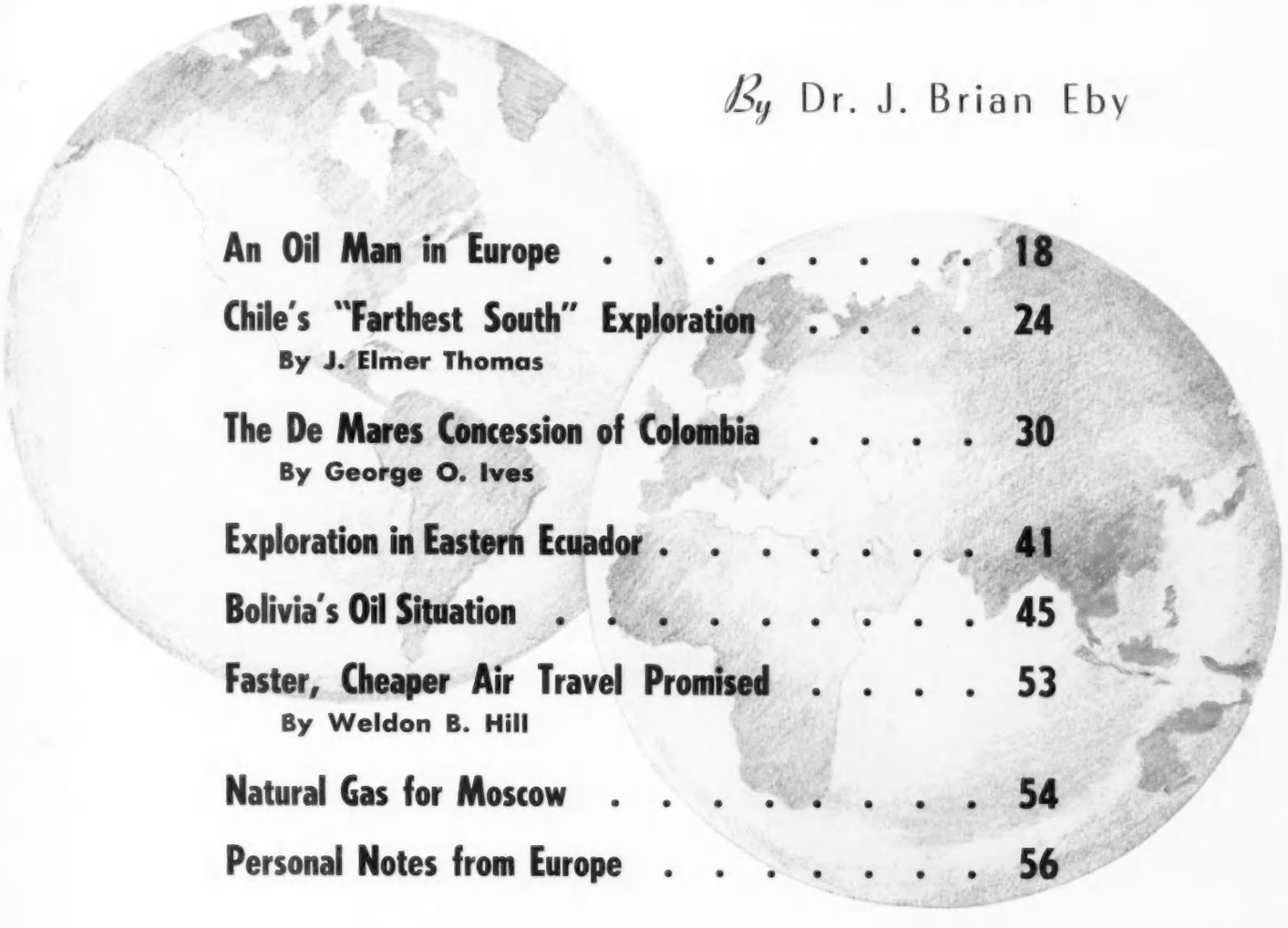
By Dr. J. Brian Eby



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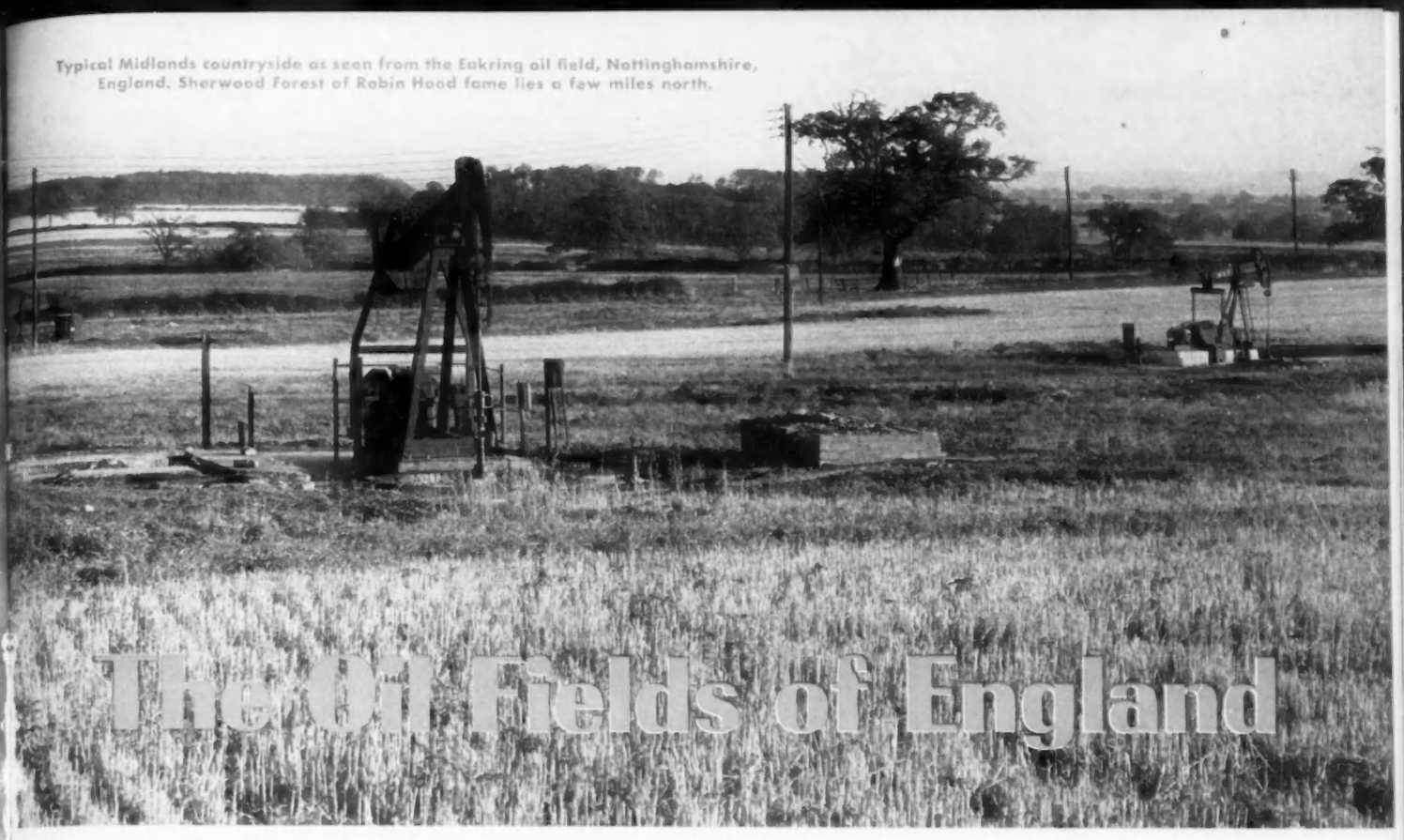


Typical Midlands countryside as seen from the Eakring oil field, Nottinghamshire, England. Sherwood Forest of Robin Hood fame lies a few miles north.

The Oil Fields of England

England's Production Continues Small But the Oil Has An Especial Value

By DR. J. BRIAN EBY, Consulting Geologist

FIVE oil fields were discovered in England during the war and while the production was small, it was a helpful contribution to the oil supply of the country in its time of greatest oil need.

Through the kindness of the Officials of the Anglo-Iranian Oil Company, the author was taken to the Eakring and neighboring oil fields of Central England. C. A. P. Southwell, geologist in the London office, obtained the necessary authorization and made all arrangements. On the ground, A. H. Taitt, manager, and R. K. Dickie, production superintendent, of D'Arcy Exploration Company (Anglo-Iranian subsidiary) offered every facility for an understanding of the structure and problems of the fields in this area. The author is grateful for the many courtesies shown him by all of the foregoing gentlemen, and the officers of the two companies.

The principal oil fields lie in Nottinghamshire, and adjoining and to the south of Sherwood Forest, made famous by the exploits of Robin Hood.

DURING the war five oil fields were opened in the Midlands, or north central section, of England. The two most important fields are known as the Eakring field and the Duke's Wood field, both of which are on the same general structure and embrace a nearly continuous producing area. Several miles to the southeast of this production is the Kelham Hills field. These three fields account for the major portion of the English production, which totals approximately 70,000 tons, or 490,000 barrels, annually. While this total annual production amounts to not much more than one tanker per month of imported oil, it proved to be of great value during the wartime years. The fields are located in the county of Nottinghamshire, about 22 miles from Newark-on-Trent. The geological and index map of England shows the location of the three big fields and the two smaller fields, known as the Cauton field and the Formby field.

The first discovery of oil in England was at Hardstoft, in the Midlands where a small producing well was encountered in the property of the Duke of Devonshire. From the time of the Norman conquest all minerals in England belonged to the owner of the land. This was the situation during World War I, at which time an effort was made to nationalize the oil and gas resources of England, but it failed to be enacted into law. The first step in nationalizing the petroleum resources of the country was taken in 1934, under what is known as the Petroleum Production Act of 1934. The act was not made retroactive, and the one-well oil field at Hardstoft remained the property of the Duke of Devonshire and his successors.

Active Interest Aroused

Due largely to the many small tract ownerships and the difficulty of getting a

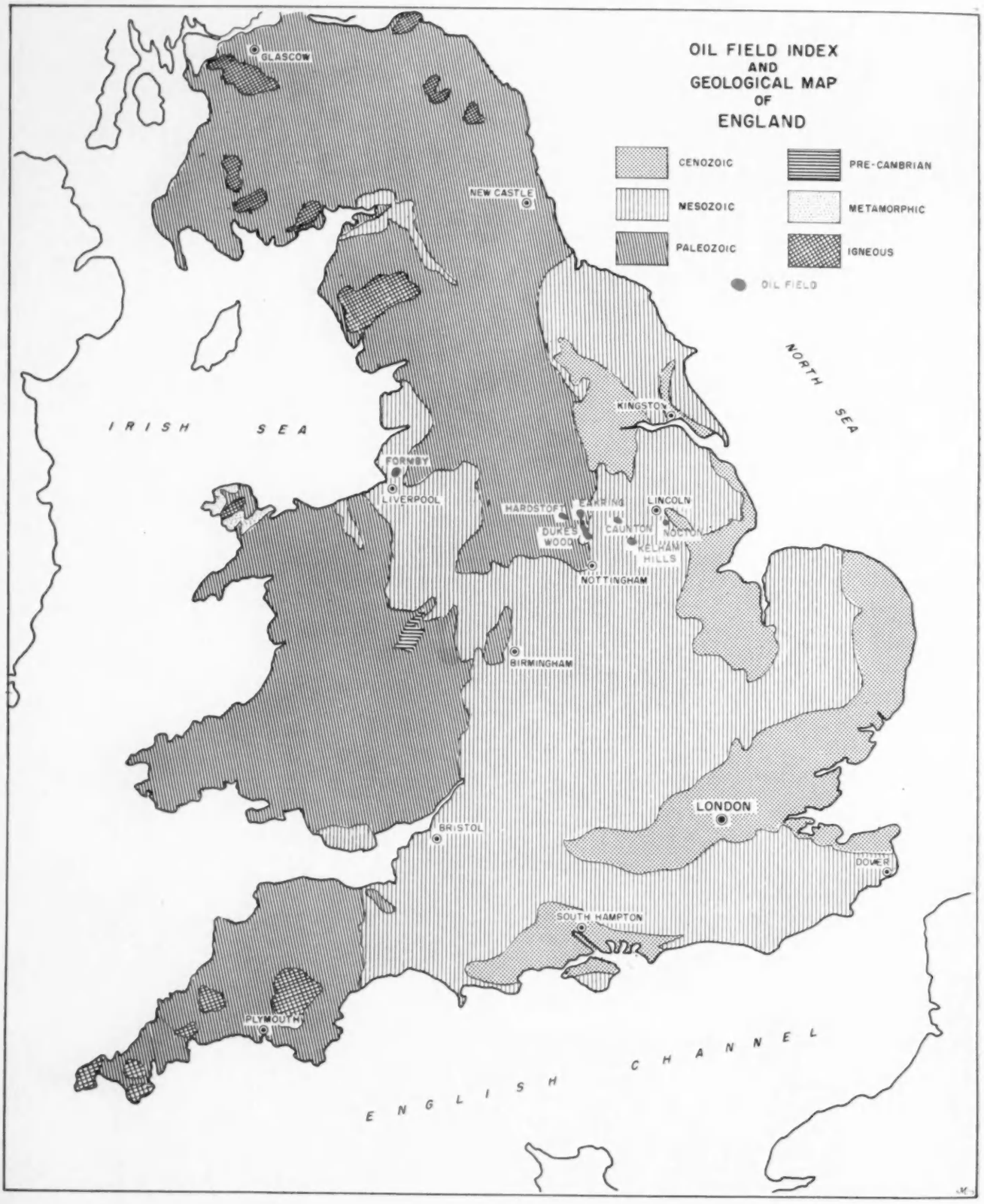

OIL FIELD INDEX
AND
GEOLOGICAL MAP
OF
ENGLAND
CENOZOIC
MESOZOIC
PALEOZOIC
PRE-CAMBRIAN
METAMORPHIC
IGNEOUS
OIL FIELD
GLASCOW
NEW CASTLE
KINGSTON
LINCOLN
FORNBY
LIVERPOOL
HARDSTOFT
EAKRING
DUKES WOOD
CAUNTON
NORWICH
KELHAM HILLS
NOTTINGHAM
BIRMINGHAM
LONDON
BRISTOL
DOVER
SOUTH HAMPTON
PLYMOUTH
IRISH SEA
NORTH SEA
ENGLISH CHANNEL

FIGURE 1

A pumping well in the front yard of an English farm home.

satisfactory lease block, exploration for oil lapsed in the interval between the two World Wars. After the passage of the Petroleum Production Act of 1934, Anglo-Iranian Oil Company, through its subsidiary, D'Arcy Exploration Company, and under the direction of the late Lord Cadmon, took an active interest in exploring for oil in England.

A Petty reflection geophysical crew operated in the Midlands section of England during parts of 1937-38-39, and this was followed by refraction work by crews of Anglo-Iranian Oil Company. It developed that, due to the peculiar peculiar subsurface conditions, refraction work gave more satisfactory results than reflection. In most cases, the geophysics was carried out in areas indicated by surface geological interest.

Midlands Geology

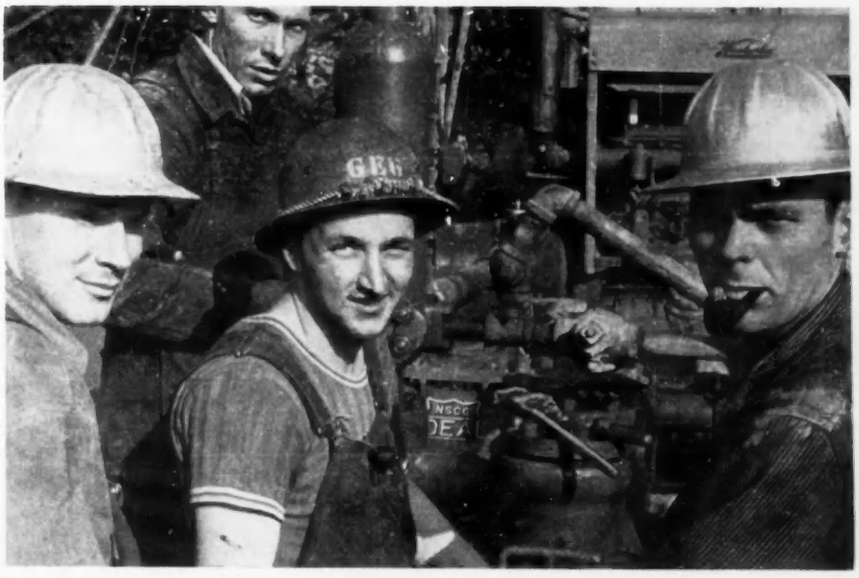
The general geology of the Midlands as shown by the cross-section given herewith (Figure 3). It will be seen that the producing oil fields occur on the outcrop of rocks of Triassic age and that the oil sands are found in the upper and lower Carboniferous. The regional structure in the vicinity of the oil fields is dominated by the gently dipping flank of the Pennines anticline. Accumulation within the fields is controlled by small anticlines of low relief, as shown by the cross-section, Figure 3.

The discovery well of the Midlands area was drilled in June, 1939, and completed as a producer in July. This well came in as a pumper making between 80 and 100 barrels per day, and later settled to 70 barrels per day. At the present time it is still pumping approximately 10 barrels per day. From the discovery well, 54 additional wells were drilled, closely followed by the discovery of the Duke's Wood field, the Kelham Hills field and the Caunton field. At the present time there are 112 producing in the Duke's Wood field, 54 in the Kelham Hills field, and 10 in the Caunton field, making a total of 230 producing wells in the four fields. As can be seen from the map, these four fields are relatively closely grouped. The Formby field at Lancashire is of little importance and, at the end of this year, is producing only 10 barrels daily from 8 wells.

The wells of the Eakring and Duke's Wood fields are shown in Figure 4.

The exact status of the producing formations, the sand thickness and the annual and accumulated production from these fields is given by Tables 1 and 2.

With the discovery of oil at Eakring in the latter part of 1939, and the emergency brought about by the war, the Anglo-Iranian decided to bring in American drillers and equipment to facilitate the development of the field. The services of Lloyd Noble Drilling Company of Ardmore, Oklahoma, and Frank Porter of Oklahoma City, were solicited, and



American oil drillers spent most of 1943 in the Eakring and Duke's Wood fields. They instructed English crews and returned to the United States in 1944.

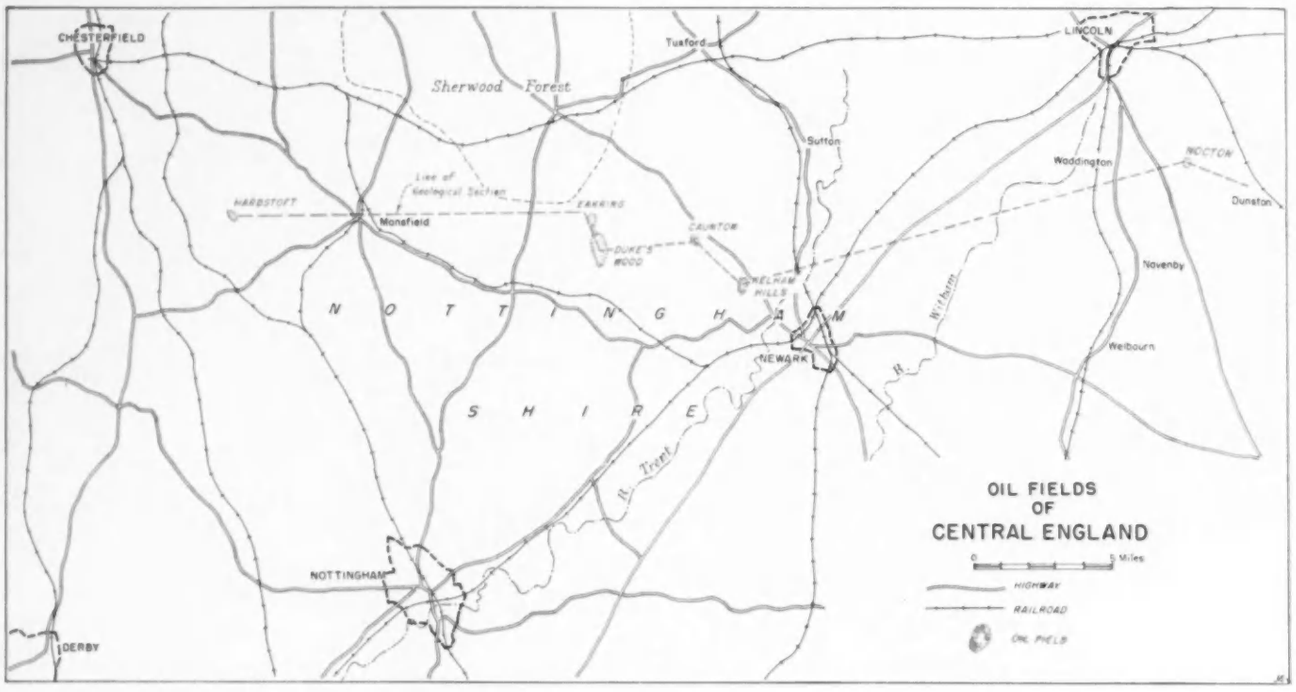


FIGURE 2

a team of drillers under their superintendent, Gene Rosser, went to England in 1942.

Portable Derrick

The drilling was carried out with jackknife portable derricks, unitized drilling rigs and 4½-inch drill pipe. The portable derrick (see photograph) has an 87-foot mast and is capable of drilling to 5000 feet. As will be noticed from the table of producing formations, all of the production in all of the fields in England ranges from shallow depth to a total depth of 2670 feet. The complete and detailed drilling program and the geology of the region has been set out by C. A. P. Southwell in a paper entitled, "Petroleum in England," printed in a Journal of the Institute of Petroleum, Vol. 31, No. 254, February, 1945. Southwell is geologist for Anglo-Iranian Oil Company, and the geological sections and data as given below are reproduced from his publication and with his permission. The formations drilled through in the producing fields are as follows:

Triassic

Keuper: Marls and sandstones, 200-500 feet thick.

Bunter: Water-bearing sandstones, ca. 500 feet thick.

Permian

Shales and marls: 200 feet thick.

Limestone: 150 feet thick.

Carboniferous

Coal measures: Coal-bearing series, 700-800 feet thick, with coal seams a few inches to 6 feet in thickness, and thin and irregular oil sands in the basal part.

Millstone grit series: 200-750 feet thick; sandstones and grits with shale bands and fireclays, the main oil horizon being the rough rock, 50-100 feet thick, the topmost sandstone of the series.

The following is from Southwell's "Petroleum in England":

"Rock-bits are necessary throughout the drilling. In order to save the shipping of rock-bits to this country, an extended trial was given to drag-bits of various types which could be manufac-

TABLE 1
Engineering and Geological Data on England's Oil Fields

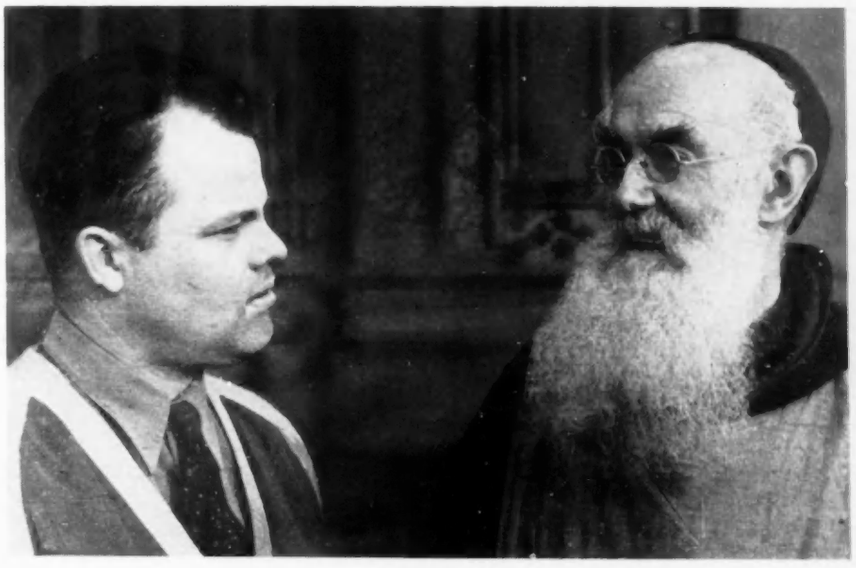
FIELD	Range of Gravity of Oil (API)	PRODUCING FORMATION						
		Name	Kind (Lime, Sand, etc.)	Age	Depth of Wells (Ft.) Min. to Top of Pay	Depth of Wells (Ft.) Max. Total Depth of Wells	Average Thickness of Pay (Feet)	Type of Structure Salt Dome, etc.)
Eakring, Nottinghamshire	33-34	B. Sandstone Rough Rock Longshaw Grit Chatsworth Grit	Sandstone	Upper Carboniferous	1884	2260	10 50 20 100	Dome with faulting.
Duke's Wood, Nottinghamshire		Ditto* and Lower Carboniferous	Sandstone & Limestone	Upper and Lower Carboniferous	1800 2550	2230 2670	100	Dome with faulting.
Kelham Hills, Nottinghamshire	29	Upper Grit Lower Grit	Sandstone	Upper carboniferous	2050	2280	40 30	Dome with faulting.
Caunton, Nottinghamshire	29-31	Upper Grit Lower Grit	Sandstone	Upper Carboniferous	2160	2290	15 15	Dome with faulting.
Formby, Lancashire	34-35	Keuper Waterstones	Sand and Shale	Trias	90	120	20	Faulted monocline.

* With average thickness, in feet, of pay as follows: B. sandstone, 20; Rough rock, 70; Longshaw grit, 20; Chatsworth grit, 60.

tured here, but these proved to be quite unsuitable. An average of about 100 feet per rock-bit was obtained when using a viscous, chemically treated mud made of dry ground, Coal Measure shale, to which was added a bentonitic material available in this country. With increased drilling speeds and more rapid completions it became possible to modify this practice without causing damage to the walls of the hole, and wells were started with clear water, to which later a little bentonitic material was added. With this circulating fluid the footage per bit improved, and as much as 800 feet of drilling has been achieved with one rock-bit, the average for production wells being six, as against thirteen bits used in the earlier wells. Conservation of rock-bits has been achieved by a bit service, whereby rock-bit cutters are reconditioned before the bearings are worn out. Tungsten carbide in a tubular rod is welded on to the worn tooth with an oxy-acetylene flame. The plastic deposit is then shaped with a steel rod. In some cases bits have been reconditioned twice after their first run, and it is estimated that this gives the bits an average of 70 percent additional life.

From Southwell

"In the earlier wells considerable difficulty was encountered with the loss of circulation in the marls and with the building up of mud cakes on the wall of the hole when drilling through the Bunter sandstone. A very careful mud control was necessary to avoid this, and samples were sent to the mud laboratory at regular intervals, and the mud conditioned with bentonite and aquagel to specification. As an additional safeguard, a 14⅛-inch hole was drilled through the Bunter, after which the hole was reduced to 10⅝-inch down to the casing seat, approximately 2000 feet deep, above the first producing oil-sand; there 8⅝-inch collar casing was cemented with sufficient cement to obtain cement returns at the surface to safeguard the coal seams. With the need to conserve steel and drilling bits, later wells were completed with 6⅝-inch casing, which served as the oil- and water-string, drilling an 8⅝-inch hole throughout, thus saving seven tons of steel per well.



Gene Rosser, Ardmore, Okla., drilling superintendent for Noble Drilling Company, chats with Father Edgar of Kelham Chapel, Society of the Sacred Mission, at Kelham Hills, near Eakring.

Mud Losses Overcome

Although these wells are normally one-string wells, it has been necessary in a few cases to cement a long conductor string, as excessive circulation losses have been met in the formations above the Bunter sandstone. Various methods of overcoming these mud losses have been tried, but finally a method using a 50/50 mixture of plaster of Paris and cement, with a very fast set, pumped in through tubing, proved to give a quick and successful shut-off in the zones where mud losses have been experienced; a shutdown of only two hours is required for setting. Small losses have been dealt with by a mixture of finely chopped flax straw with bentonite mud. With the low viscosity mud a high circulation speed is essential, and if this is achieved fishing troubles are reduced to a minimum.

"In order to achieve the necessary drilling speed, maximum pump pressures and high circulating speed are necessary, the flush quantities giving an annulus speed of 150 feet per minute. With this, and a circulating fluid of little better than dirty water, excellent settling of the cuttings in the mudpits has resulted, good uncontaminated samples have been obtained for the geologist, and the recirculation of the abrasive sediment has been prevented.

"With the rapid speed of drilling considerable care has been taken to keep the holes vertical. Checks for verticality are taken every 250 feet with a single shot recorder. Over-sized drill collars add the necessary weight to the bottom of the string and, with a relatively small clearance between the 5½-inch drill collars and the 8⅝-inch hole, little difficulty has been experienced in maintaining straight hole. A maximum weight equal to 1200 feet of drill-pipe has been used.

"Correlation for casing seats and structure control has been obtained by a combination of samples from a screen or shale-shaker at the outlet from the conductor pipe and the use of a penetration recorder. Particular attention has been paid to the coal seams penetrated, from which bulk samples have been obtained and submitted to laboratory for detailed examination.

Cementing Practice

"The cementing practice has been conventional. Concrete and rubber plugs are used, and ink released from an imbedded bottle stains the mud and indicates the plug position when drilled up. A quick-release cement head is used. The cementing outfit is a trailer-mounted independent unit, made on the field, and efficiently operated by locally-trained men. Forty-

TABLE 2

England's Producing Oil Wells and Crude Oil Production, by Fields
Note: Figures for 1945 include estimates in respect of Nov./Dec.

FIELD†	Year of Discovery	Oil Wells at End of 1945 Producing		Crude Oil Production—(Barrels)				
		Art. Lift	Total Prod.	Daily at End of 1945	Year 1944	Cumulative Through 1944	Year 1945	Cumulative Through 1945
Eakring	1939	51	51	310	161,000	743,000	121,000	864,000
Duke's Wood	1943	112	112*	625	336,000	1,138,000	259,000	1,397,000
Kelham Hills	1943	53	53	285	154,000	516,000	113,000	629,000
Caunton	1943	9	9	95	39,000	56,000	35,000	91,000
Formby	1939	8	8‡	10	6,000	47,000	4,000	51,000

† All fields in Nottinghamshire, except Formby in Lancashire.
* One well shutin.
‡ 6 wells shutin.

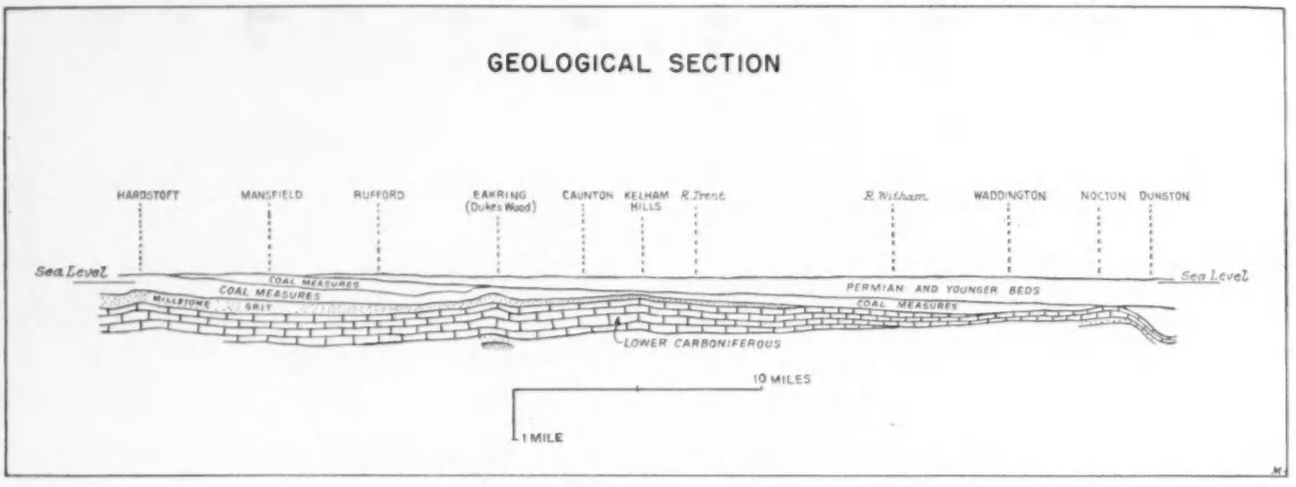


FIGURE 3

eight hours is allowed for the cement to set.

"With a 6⅝-inch water-oil string the oil-sands are drilled through with a 5⅜-inch bit. The perforated liner is then run to hold back the caving fireclays, petal baskets being incorporated in the liner at the top and bottom of each oil-sand. The well is then circulated, and rods and tubing are run in by the drilling outfit before it moves off to the next site. After moving the outfit, the pump is installed, the well being placed on production in a matter of hours.

Production Characteristics

"The general characteristics of the three oil fields, Eakring, Caunton, and Kelham, from which the greater part of the production is obtained are, briefly, as follows:

"Each oil field consists of a simple, domal structure with minor faulting, containing a number of separate, sometimes lenticular, and independent oil-sands; the Rough Rock, a hard sandstone, varying from 50 to 100 feet in thickness, is the main producing horizon in the larger Eakring oil field. In this field, which is two miles long by half a mile wide, four separate oil-sands yield production in the central part of the structure, whereas in the smaller Kelham and Caunton fields only two oil-sands are present, and these are thinner, being each about 30 feet thick and separated by some 70 feet of shale. Each sand has its own particular type of crude oil and edgewater. These oil horizons lie mainly in the Millstone Grit Series of the Upper Carboniferous, but they extend upwards into the basal part of the Lower Coal Measures. The sandstones vary considerably both in porosity and permeability, the former ranging from 0 to 20 percent and the latter from 2 to 1000 millidarcies. The oil column is small, being of the order of 250 feet at Eakring, and only some 40 feet at Caunton.

"Well spacing was originally planned at 500 feet between wells, but this was later reduced by drilling infilling wells suitably placed to give an overall well spacing of one well to 2½ acres on the Eakring field, and one well to 3 acres on the Kelham and Caunton fields—a spacing which is considered to be satisfactory for these reservoir characteristics. The initial well production vary from seven barrels a day to as high as 375 barrels per day. When, however, the infilling drilling programme had been nearly completed, it was found that the later wells drilled yielded approximately the average production to which the majority of wells had declined at that time.

Gas-Oil Ratios Small

"Every opportunity, so far as the speed of operations has permitted, has been taken to obtain petroleum engineering data so that the reservoir problems can be fully understood, and in this connection the fullest advantage has been taken of the experience gained in the Persian oil fields. Before production started the pressures for any particular datum level were practically the same for the different sands in each oil field, but, as was to be expected, after production started the pressure decline was varied in the different sands dependent on the production obtained and on the characteristics of the sand. The gas-oil ratios are small, varying between 10 and 20 volumes of gas to 1 volume of oil; the crudes are, therefore, considerably under-saturated with gas. It has been found that the production decline has been rapid until the pressure reached the saturation pressure of the crude, after which the production decline is relatively small. Wells tend to group into two types: small, low-permeability wells having a small decline throughout their life, and those with a larger initial production following the more usual decline curve of sand-field production.

Reservoir Pressures

"The original reservoir pressure in the Eakring field was approximately 990 pounds at a datum level of 1700 feet below mean sea level, the highest recorded closed-in pressure being 300 pounds. All wells would yield a small flow, the highest flowing production recorded in an initial production test being 100 barrels per day. The original saturation pressure of the gas in the crude oil was 390 pounds.

"The reservoir pressure in the Rough Rock has fallen since production started below this to 350 pounds, whereas the reservoir pressure in the Chatsworth Grit has only fallen to 700 pounds. Prior to production, the reservoir pressure at Kelham was 1220 pounds at a datum level of 2000 feet below sea level. The original saturation pressure of the gas in this field is, however, extremely low, being only 90 pounds. Reservoir pressures in the Middle Grit have declined as a result of production to 700 pounds, and in the Upper Grit to 250 pounds at a datum level of 2000 feet.

"Information obtained since production started shows that the mechanics of these reservoirs are governed by a water drive in each sand, the flood walls of which give an irregular contour due to the variable permeability of the oil sand.

Table A gives water encroachment at Duke's Wood resulting from a production of one million barrels.

"The specific gravities of the crude oil in the Eakring and Duke's Wood domes varying in the different sands and also

between the two domes are shown in Table B.

"The specific gravities of the crude from the Kelham and Caupnton fields are shown in Table C. It will be seen that these yield a consistently heavier oil than at Eakring.

"It is of interest to note that there is a considerable difference in the rock temperatures of these fields, the temperature at Eakring being much higher than at Kelham Hills. The temperature differences are shown in Table D.

"The crude is greenish-brown in colour, and is of a mixed type. The motor and aviation gasoline distillates are mixed types, with naphthenic characteristics predominating, and are interesting from the standpoint of the high-octane-number values and non-knocking properties. There is a large amount of paraffin wax present in the crude—more than double the amount present in an average Mid-Continent crude. The sulphur content is low, and is distributed in a normal manner. The gasoline distillate has a low sulphur content of 0.01. There is practically no elementary sulphur in solution in this crude. Lubricating oils of high grade can be prepared which compare favourably with those from Mid-Continent crudes.

"Minor differences occur between the oils in the various sands and fields, but a typical analysis of the crude from Eakring No. 1 well is given in Table E.

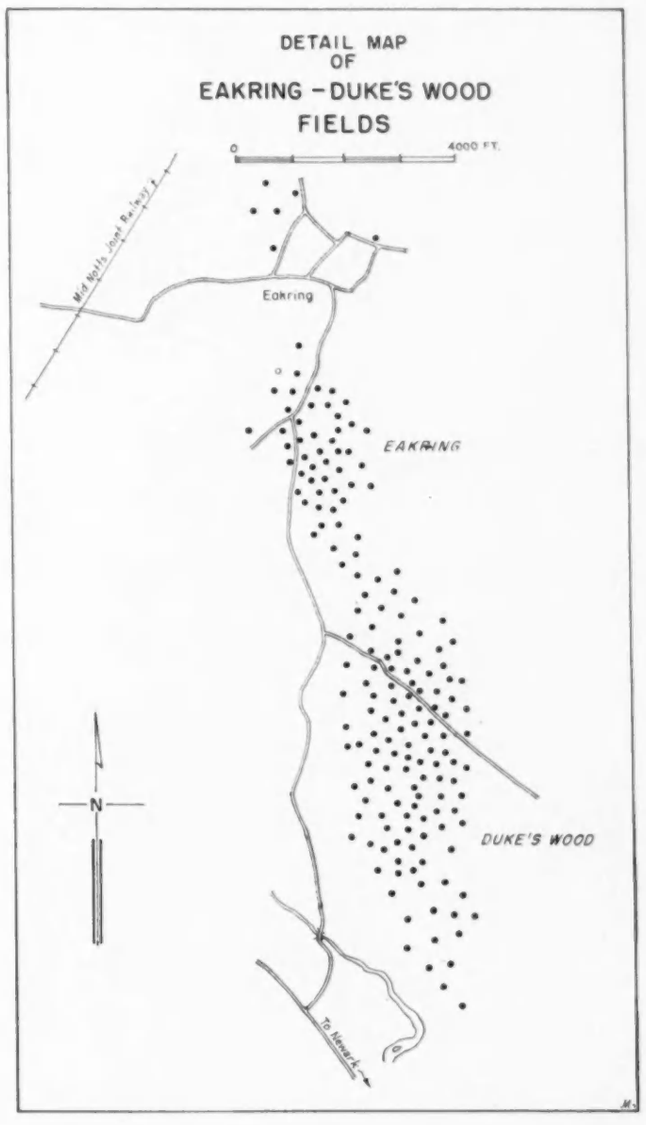


FIGURE 4

TABLE A

Eakring Field—Duke's Wood Dome

HORIZON	Original O./W.	Oil Column Feet	Present Highest Water Elevation	Maximum Rise in O./W., Feet
B. Sandstone	8260	238	8275	Up to 15
Rough Rock	8240	208	8310	Up to 70
Longshaw Grit	8200	110	8260	Up to 60
Chatsworth Grit	8180	62	8218	Up to 38

NOTE:—Elevations given in feet above a datum of 10,000 feet B.S.L. Water encroachment has been more rapid when related to the production drawn in the Longshaw and lower part of the Chatsworth Grit than it has been in the Rough Rock, owing to the greater permeability of the former.

TABLE B

SAND	Eakring	Duke's Wood Dome
B. Sandstone	0.853	0.863
D. Sandstone	0.828	....
Rough Rock	0.848	0.861
Longshaw Grit	....	0.857
Chatsworth Grit	0.837	0.862

TABLE C

SAND	Kelham Hills	SAND	Caunton
Upper Grit	0.892	Upper Grit Group	0.880
Middle Grit	0.880	Middle Grit Group	0.870

TABLE D

Depth Below Mean Sea Level, Ft.	Eakring	Duke's Wood	Kelham Hills
500	61° F.	60° F	57° F.
1000	75° F.	70° F.	63° F.
1500	97° F.	85° F.	72° F.
2000	118° F.	103° F.	83° F.

TABLE E

	Rough Rock, Crude	Lower Producing Sands, Crude
Specific gravity at 60° F	0.848	0.828
Distillation:		
I. B. P., °C	51	37
Percent Volume to 100° C	3.5	8.0
Percent Volume to 200° C	21.0	27.0
Percent Volume to 300° C	35.0	46.0
Total Distillate, percent	36.5	46.0
Residue, percent	61.5	50.5
Loss, percent	2.0	3.5
Distillate, specific gravity at 60° F	0.778	0.770
Residue, specific gravity at 60° F	0.892	0.884
Sulphur, percent	0.18	0.07
Pour Point, °F	....	50
Temperature at which wax deposition commences, °F	85	80
Viscosity at 70° F. c.s.	....	15.09
Viscosity at 80° F. c.s.	....	8.97
Viscosity at 85° F. c.s.	....	....
Viscosity at 100° F. c.s.	....	5.33
Viscosity at 120° F. c.s.	....	4.27
Viscosity at 122° F. c.s.	....	....
Viscosity at 150° F. c.s.	....	....

A jackknife derrick on an Eakring well location. No speeding by automobiles allowed.

"Two problems common to many oil fields have to be met: firstly, water separation, and secondly, those caused by the waxy nature of the crude.

"In the early life of the field the oil from the crestal wells was water-free, but as drilling proceeded down-flank the few wells producing water were flowed to a wash-tank in which the oil-water mixture was heated by steam coils and separated. With the increase in water production, now amounting to about 30 percent of the fluid recovered at the Eakring field, more efficient water separation arrangemenst have been installed. The present separators in use require the oil to pass through wood-wool packing, and these separators reduce the water content of wet oil to about 1 percent. The oil-water fluid passes through at a rate of about 5 feet per hour. A sulphonated oil is also used as an emulsion-breaker, being added to the well fluid at the rate of about 0.003 percent. The separators are heated to a temperature of 110° F. by steam coils, dry gas from the adsorption plant being used for steam generation.

"The high wax content of the oil causes many difficulties, both in surface lines and in the upper part of the wells, as wax starts to settle out at temperatures below 80° F. In the surface lines this is overcome by go-devilling all lines daily. In the well itself the main difficulty lies in the top 700-800 feet, and the need to pull wells for mechanical de-waxing purposes has been overcome by the following means: the tubing at each well is insulated from the casing by wooden insulators to about 1000 feet, and at the tubing head by supporting it on a plastic ring; contact is made at 1000 feet in the well with the casing by welding four steel strip bows to a special collar. For de-waxing, a portable direct-current generator is taken to the well and connected to the tubing. Current of a low voltage is passed through the tubing-casing circuit with a heavy amperage (600-800), resulting in the heating of the top 1000 feet of tubing to a temperature high enough to melt the wax and enable the well to pump this away, thus obviating pulling operations.

"A number of experiments has been carried out to increase production from these sands: acid treatment, water rock-

TABLE 3
Wildcats Completed in England and Scotland in 1944 and 1945

STATE	COMPANY, WELL AND LOCATION	Date Completed	Total Depth (Feet)	RESULTS
Lanarkshire	Salsburgh No. 1 A. 3 miles E. of Airdrie	5-11-45	4267	Abandoned—Devonian.
Linlithgowshire	Blackness No. 1, 4 miles E. N. E. of Linlithgow	9-27-45	2455	Abandoned—Lower Carboniferous
Linlithgowshire	Easter Pardovan No. 1, 3½ miles E. of Linlithgow	.....	....	Drilling.
Lancashire	Formby No. 1, 1 mile E. of Formby	.....	6382	Suspended ?
Lancashire	Formby No. 3, 4 miles N. W. of Ormskirk	7- 7-44	5735	Abandoned—Upper Carboniferous ?
Lancashire	Bickerstaffe G1, 4 miles S. E. of Ormskirk	3-29-44	1901	Abandoned—Millstone Grit.
Lancashire	Upholland No. G1, 5 miles E. S. E. of Ormskirk	5-22-44	1950	Abandoned—Millstone Grit.
Leicestershire	Sproxoton No. 1, 7 miles N. E. of Melton Mowbray	8-12-45	3012	Abandoned—Pre-Cambrain ?.
Lincolnshire	Long Bennington G1, 6 miles N. W. of Grantham	6- 6-44	2358	Abandoned.
Lincolnshire	Long Bennington G2, 8 miles N. W. of Grantham	6-26-44	986	Abandoned.
Lincolnshire	Nocton 3A, 5 miles S. E. Lincoln	2- 4-44	3190	Abandoned—Carboniferous Limestone.
Lincolnshire	Nocton 4, 5 miles S. E. Lincoln	1- 6-44	3174	Abandoned—Carboniferous Limestone.
Lincolnshire	Nocton 5, miles S. E. Lincoln	3- 8-44	3175	Abandoned—Carboniferous Limestine.
Lincolnshire	Nocton South No. 1, 6 miles S. E. of Lincoln	4- 5-44	3087	Abandoned—Carboniferous Limestone.
Lincolnshire	Dunston No. 1, 8 miles S. E. of Lincoln	2-10-44	4265	Abandoned—Carboniferous Limestione
Lincolnshire	Stixwould No. 1, 5 miles S. W. of Horncastle	1- 5-45	4771	Abandoned—Carboniferous Limestone.
Lincolnshire	Spital No. 1, 12 miles N. of Lincoln	8-30-44	5594	Abandoned—Carboniferous Limestone.
Norfolk	North Creake No. 1, 7 miles N. W. of Fakenham	5-15-45	2632	Abandoned—Pre-Cambrian ?.
Nottinghamshire	Thorpe No. 1, 3 miles S. W. of Newark	1- 4-45	2270	Abandoned—Carboniferous Limestone.
Nottinghamshire	Winkburn No. 1, 5 miles N. W. of Newark	8- 5-45	2504	Abandoned—Millstone Grit.
Nottinghamshire	Norwood No. 1, 1 mile N. W. of Southwell	5- 8-44	3050	Abandoned—Carboniferous Limestone.
Nottinghamshire	Normanton No. 3, 1 mile E. N. E. of Southwell	12-30-44	2965	Abandoned—Millstone Grit.
Nottinghamshire	Normanton No. 4, 1 mile E. N. E. of Southwell	3-22-45	2859	Abandoned—Carboniferous Limestone.
Nottinghamshire	Springwood No. 1, 4 miles W. N. W. of of Newark	4-21-45	2560	Abandoned—Millstone Grit.
Nottinghamshire	Maplebeck No. 1, 7 miles N. W. of Newark	3- 8-45	3047	Abandoned—Carboniferous Limestone.
Nottinghamshire	Hockerton No. 1, 2 miles N. N. W. of Southwell	4-13-45	2554	Abandoned—Millstone Grit.
Nottinghamshire	Widmerpool No. 1, 8 miles S. E. of Nottingham	6-25-45	6205	Abandoned—Lower Carboniferous.
Yorkshire	Lockton No. 1, 7 miles N. E. of Pickering	8-19-45	1499	Abandoned—Lower Lias.
Yorkshire	Kirkleatham No. 1, 6 miles E. of Middlesborough	9-22-45	3736	Abandoned—Carboniferous Series.
Yorkshire	Aldfield No. 1, 5 miles S. W. of Ripon	10-15-45	429	Abandoned—Carboniferous Limestone.
Yorkshire	Sawley No. 1, 6 miles S. W. of Ripon	.....	....	Drilling.
Yorkshire	Ellenthorpe No. 1, 2 miles E. of Boroughbridge	.....	....	Drilling.

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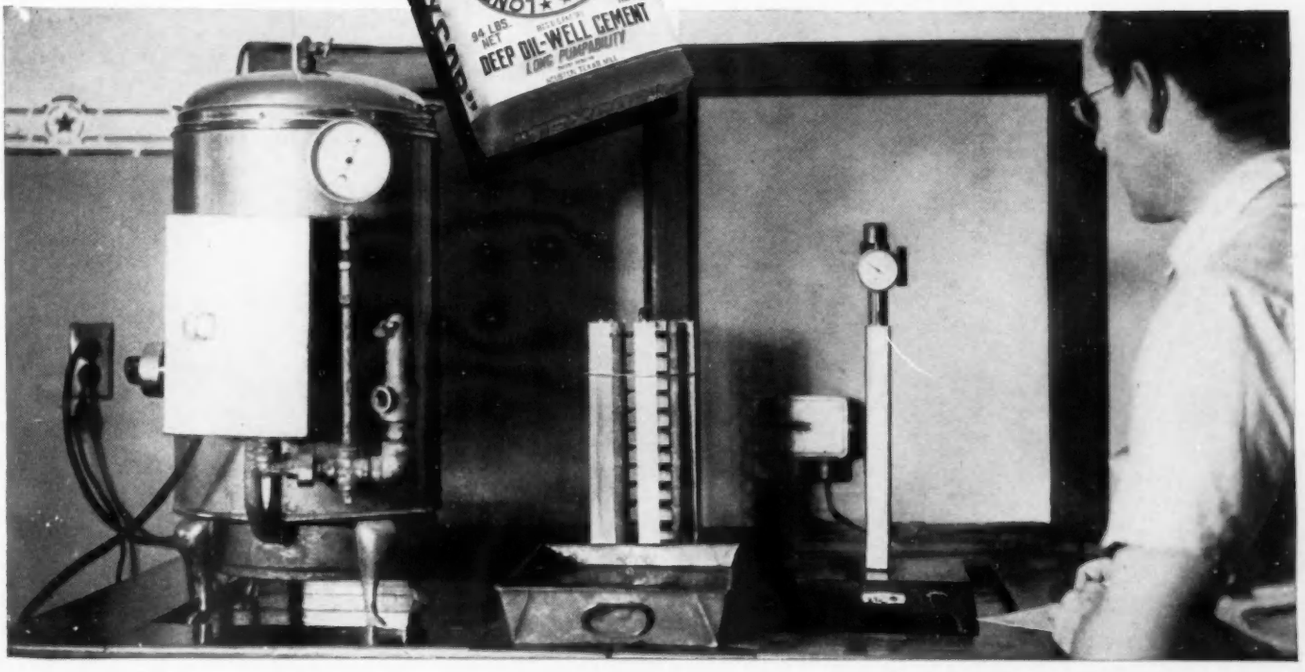

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ing with chemical water-wetting agents, and the shooting of the sands.

"Of these, shooting has given the most promising results, and a shooting technique has been developed using Polar blasting gelatine exploded by time-bombs. The latest practice is to use a delay-action device produced in this country, making use of the time taken to break a lead-alloy element when in tension. When broken, the electrical contact is made, and this device has provided a very satisfactory delay timing action, being reliable and completely simple to incorporate with the electrical firing.

Tamping Method

"Explosive charges up to 400 pounds are used, lowered in containers with boosting pellets distributed throughout the charge. The normal practice is to use solid tamping—crushed gypsum—the tamp being placed on top of a canvas umbrella above the explosive. This method of tamping, whilst giving a maximum explosive effect, makes the cleaning out after the charge has been fired a simple matter.

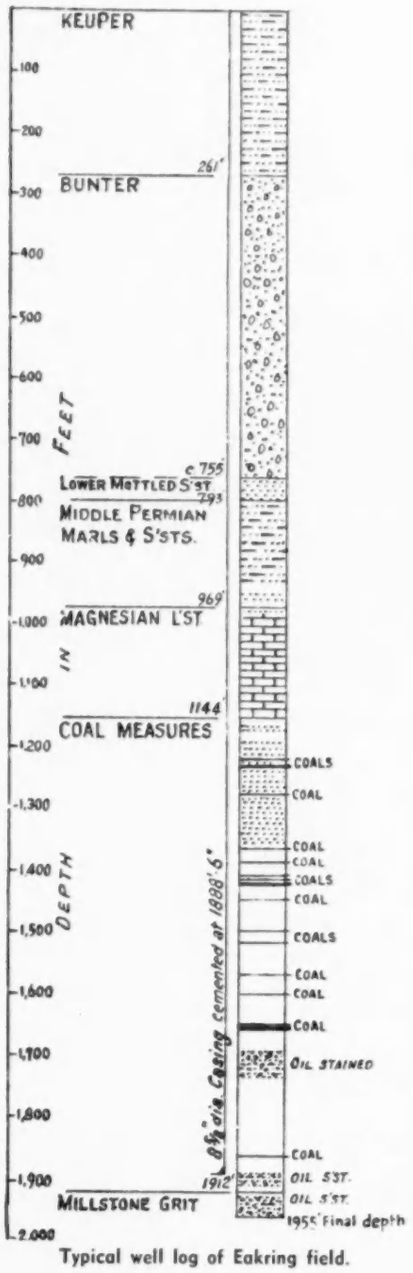
"In shooting multiple sands, difficulty has been encountered with caving fireclay, and in this case an asbestos cement liner is run which can be drilled up after shooting. Increases as high as 200 percent in production have been obtained.

"No discussion of wartime development of petroleum in this country would be complete without reference to two further small sources of supply developed by the Anglo-Iranian Oil Company; I refer to Formby, in Lancashire, and the original Pearson well at Hardstoft.

"Attention was directed in the *Memoirs of the Geological Survey* to surface seepages in a peat bog underlying the Trias at Formby. Shallow wells drilled with a geophysical Failing outfit to the base of the Glacial Drift—about 100 feet—defined a seepage area amounting to some 30 acres. Of the 25 wells drilled, 12 gave sufficient production to justify pumping, and pumps were installed. These wells have to date produced 45,000 barrels of oil, and the production after five years is remarkably steady at about 120 barrels per week. Some of the wells are being produced under vacuum.

Source Unknown

"An examination of the crude, combined with the slow decline, indicates that these wells may be fed from a deeper source. Where this source is has provided us with a problem to which a solution has not yet been found. A deep test located within the seepage area has been drilled to 6380 feet, the greater part



Typical well log of Eakring field.

through sandstones, without finding any trace of a deeper oil. At 5885 feet it penetrated a hard, silicified rock, believed to be Upper Carboniferous, or younger, and this hard formation has continued down to the present depth. The hardness of the rock is such that the hardest formation rock-bit is completely worn out after drilling for only a few minutes, and the penetration may be only a matter of inches.

"The Pearson well at Hardstoft, the first producing well in England, was taken over by the Anglo-Iranian Oil Company in October, 1937. In the first place, it was necessary to put the well into a satisfactory mechanical condition, with the object of deepening into the limestone to find out where the oil-water level was located and to see if more production could be obtained.

"When these operations were completed, a series of experiments was undertaken in an endeavour to increase the production. Delayed acid treatment and water rocking with water-wetting agents were undertaken. As a result of this, the production from this well was improved, and 8700 barrels of oil have been produced during the war period. The well is still pumping at a rate of a few barrels of oil per day with large quantities of water."

Wildcat Record

Many wildcat wells have been drilled in England, the majority in the Midlands section. About 30 were drilled in the last two years as listed by Table 3. In addition to Anglo-Iranian, two American companies, Anglo-American and Gulf Oil Corporation, carried out exploration and drilling over the past several years. The Gulf drew out during the latter part of the war, but may reenter the field in the near future. Anglo-American is producing a few barrels daily from a small oil strike in Scotland but are not devoting too much time to England at this moment.

Steel Bros. & Company, a British firm from London, has done some exploration in England and drilled two wells without success.

Anglo-Iranian, through D'Arcy Exploration Company, is drilling a wildcat on the Birmingham anticline, three miles north of Chesterfield in the Midlands. In wildcatting they use an 87-foot jack knife derrick and drilling a 8⅝-inch hole with rock bits. It is customary to rat hole ahead 200 feet with 5-⅝-inch hole and then ream out to size if nothing is found. A form of English bentonite is used to make a mud mix. It takes almost three weeks to drill a hole. Electric logs are taken by engineers usually brought over from Paris.

High-Value Oil

In considering the oil producing possibilities of England, the fact is that up to the present, neither the reservoir conditions nor the source of beds for oil give too much hope for really large scale oil deposits. However, the search will continue, and, as the war demonstrated, any oil produced in England has an especial value. Total annual production is less than one-half day's production in Texas, so that English oil fields have yet to offer a substantial contribution to England's own needs.

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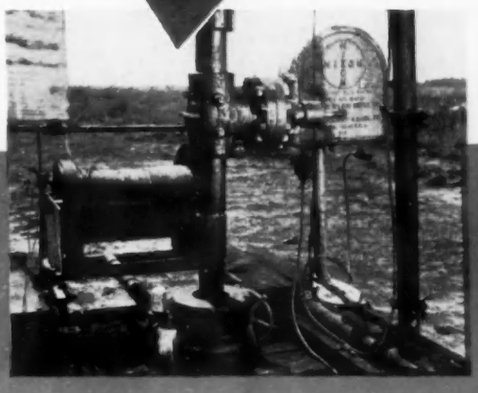
LIFT IT ✓



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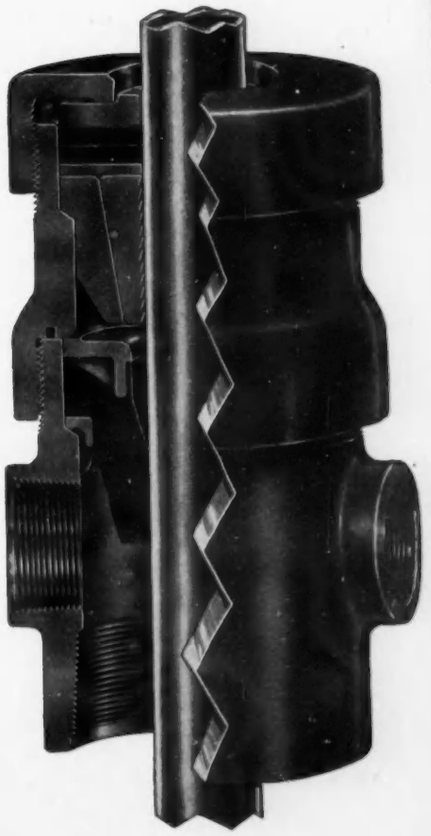

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An Oil Man In Europe

Herr Goebbels' propaganda ministry is hardly recognizable in this rubble. Three German citizens who fed their souls with his words are now carting wood to their dwelling.

Official U.S.A.A.F. Photo

By DR. J. BRIAN EBY

TRAVEL in Europe at this time is subject to many severe restrictions as an aftermath of war. To enter any Allied occupied country requires a military permit from the office of the Joint Chiefs of Staff. To enter France or Portugal requires a special letter from the State Department to the respective legation in order to obtain a visa. Great Britain is relaxing its requirements somewhat, and will honor any reasonable business request.

With our travel permits in order, our Pan-American Dixie Clipper left New York for New Brunswick. The 2100-mile oversea jump started at 4 p. m. and in the early dawn we landed in the estuary of the River Shannon, the town of Foynes. A reconverted warplane took us to London.

When I left America for Northern Europe it was for the prime purpose of examining the oil business of this area, but I found the political and industrial economy of the area is such a scramble that the problems of individual business seemed insignificant.

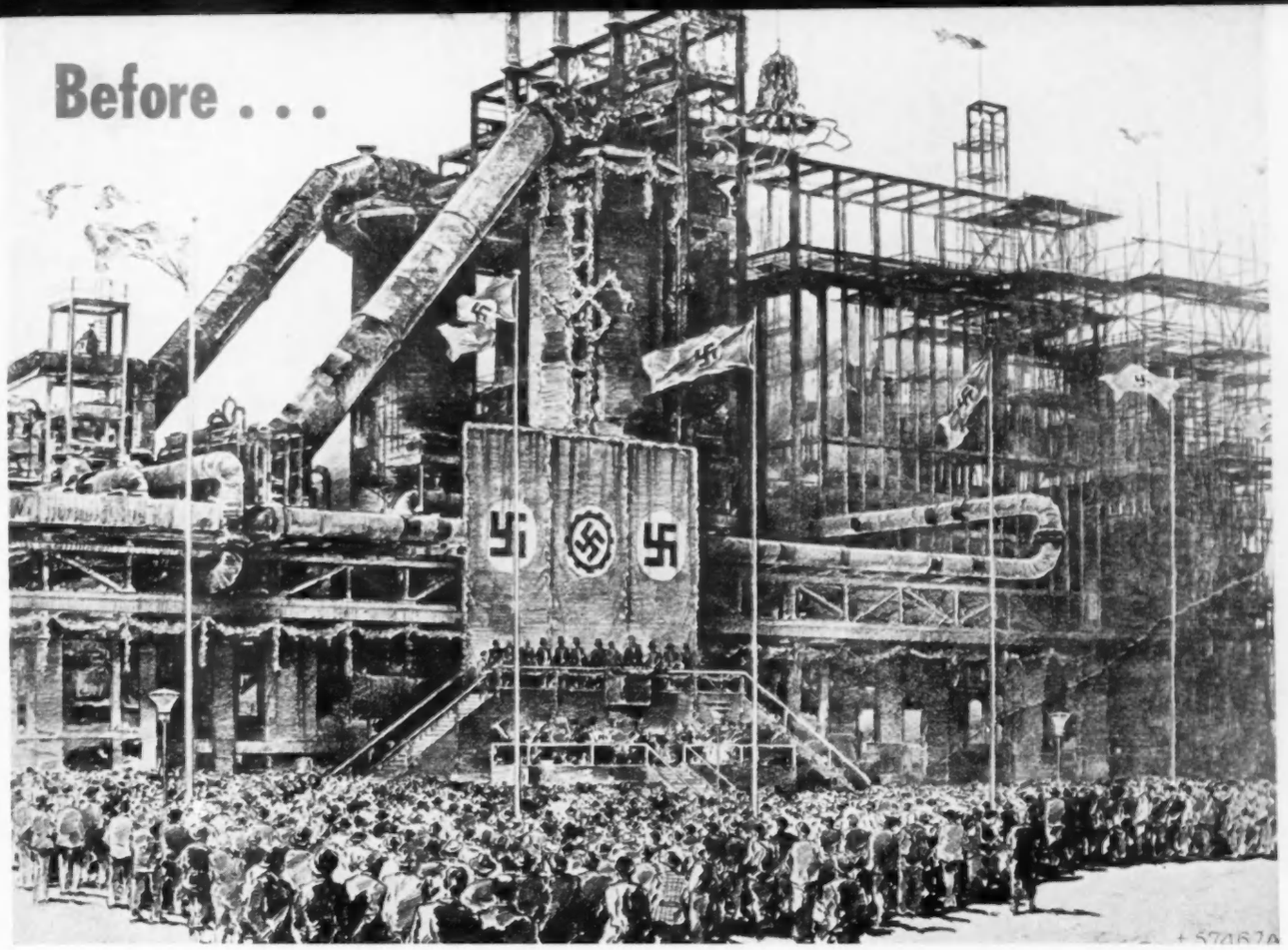
Through the courtesy of the State Department and the Army I was given an unparalleled opportunity to see some of the destruction of the war and the first efforts towards peace. I visited Army headquarters at Frankfurt and the offices of the U. S. military government of Germany in Berlin. I traveled over Germany by jeep, by bus, sedan, train and airplane. I visited the British Control Offices, and attended, as a visitor, conferences of the sub-committee on oil for the four occupying powers, the United States, Great Britain, France and Russia. As a civilian under military orders, I had the opportunity of eating with both officers and enlisted men and was the first American civilian in Berlin to dine in an enlisted WACs mess. My opportunity of meeting the civilian population was not limited.

I was particularly interested in the problems of Germany since only 12 years before I had traveled in the country and made an oil and gas survey of its resources. What happened to these resources and what they promised for the future was my immediate problem.

The shocking spectacle of destruction and death that confronts the traveler on every side has a benumbing effect. As I drove down the Unter den Linden, once one of the most beautiful avenues in the world, and saw mile after mile of desolation, I could not help recalling the 1,800,000 destroyed and damaged buildings of France, the wrecking of Coventry and Rotterdam and the thousands of ruined cities and towns of Russia and Poland, or the 15,000 London residents who died in the Battle of Britain.

Many citizens of both London and Berlin wanted me to compare the ruins. There is very little comparison. While London's damage is serious, it is scattered and the rubble largely removed from the roads and sidewalks and personal hazards are under control. The city of London is alive, 4000 of its 10,000 taxis are working, its buses and subways and street lights are operating. Its show houses and restaurants are wide open and its hotels are packed to the doors. Berlin, but for the presence of the Allied armies, is dead. There are few street lights, millions of tons of rubble to be removed, everywhere the constant threat of falling walls. The dead in the ruins are unburied, and only a few of the street car lines are in operation. There are no taxis. The first passenger train from the American zone 120 miles west of Berlin was due in the city the last days of November. There are no surface buses and only 66 out of 77 kilometers of subway are open. No water in the city is fit to drink without boiling and chlorinating.

It is estimated that it would take a 100-car freight train, making one trip a day, 16 years to remove the rubble from Berlin. It is tentatively planned to dump this rubble in the Tiergarden, which



Approximately 36 million pounds of gasoline and diesel engine fuel oil per month flowed from this plant—4 percent of Germany's synthetic oil output. About 2300 employes, of whom 40 percent were foreigners or slaves, operated the refinery. The above sketch, found by American photographers at the plant, shows high Nazi officials, against a backdrop of pomp, pageantry and publicity, moving a mass of Germans with oratory at the opening of the new refinery in 1937.

Then came 1246 U. S. Army 8th Air Force heavy bombers with 5,954,000 pounds of bombs dropped in 13 daylight attacks and the great refinery became a shambles.

Official U.S.A.A.F. Photos

A Berlin bucket brigade. German women in Berlin clean up rubble from blasted buildings.
Official U.S.A.A.F. Photos

itself is now destroyed, its monuments and statues shattered, its remaining trees being cut by civilians for fuel.

Plague Menace

The greatest danger at the moment, however, is plague or epidemic. The lack of food, clothes, fuel, soap and medical supplies is steadily lowering body resistance to the attacks of disease. The crowding of families in insufficient quarters, the return of thousands of veterans, in all stages of physical and mental demoralization, is complicating the picture. An American officer reported that recently 100 prisoners of war were released to go to their homes, but within 24 hours, 50 returned to the prison quarters and requested to be taken back.

The official U. S. ration for German civilians from November 11 to December 7 was 1354 calories per day for a normal consumer and 2560 calories for very heavy workers. There is no lard, oil, coffee, eggs, citrus or other fruits, or milk except for babies up to six years of age, and some mothers. The ration is made up of bread, cereals, potatoes, meat, cheese and a little fat when obtainable. Fish and greens are sometimes available, outside the ration. The British zone, for the normal consumer, feeds 1400 calories and the French zone 914 calorie. The normal daily ration according to public health doctors is 3400 calories for a heavy worker and 2000 calories for an average office worker. A ration of less than 1000 carolies is considered below subsistence level. The tobacco ration is 12 cigarettes a month, and old and young civilians pounce on any discarded cigarette butt.

Many civilians of different nationality complained that their rations were less than those of the worst Nazi S. S. prisoners of war. In part, this may be true, as the governing powers are sticking close to the Geneva Convention regulations. However, I have been informed that prisoner rations are scarcely to be envied.

Largely responsible for the food shortage are the lack of sizeable food imports and the complete breakdown of interior transportation facilities. The destruction of nearly all important railroad bridges in Northern Europe may have accomplished a few more weeks of Nazi rule but it will take years of rebuilding to replace them properly. Most of the great rail yards, such as near Wiesbaden, Frankfurt and Berlin, are more or less junk yards.

The money situation in Europe is strange, unreal, and certainly unstable. In France prices are nearly out of sight, a good meal costing from $20 to $40 American. In Germany, only Allied marks are acceptable exchange, the Russian (German) marks being indicated by a hyphen before the serial number. Old German marks are exchanged among the citizens. The Russian soldiers seem to have endless supplies of Russian (German) marks, and are willing to pay $10 per American package of cigaretes or 50 cents a smoke. Since the American GI pays 5 cents a pack, the temptation to do a little trading is ever there, albeit illegal. Articles of clothes and food bring fantastic prices.

The black market exists everywhere. So great is the urge and need for food and clothes that money itself has little value. German civilian musicians gladly play for their meals and many a GI and WAC has his or her laundry done regularly for a pittance of cigaretes.

Within Germany there are really two worlds in one—the Allied Army and Government peoples in one and the native population in the other. Fraternization has been greatly exaggerated and actually there is little of it in the Berlin area. American officers and soldiers enjoy regular American food and the best quarters available. The USO brings entertainment and every division has its various social clubs. The standard available drinks are cognac and, when available, Scotch and champagne, and of course, Coca-Cola.

No American civilian can enter Germany without Army orders and cannot travel or subsist except at American billets. In Berlin, I was accorded the honor of billeting in the former home of the Reichminister of Education Rust, a magnificent mansion. Its concrete air raid shelter chambers far underground exceeded those of the Reichschancellory. One other civilian, George Tiffany, of Stamford, Conn., official of a chain of food manufacturing plants in Europe, shared these accommodations with me. The house was completely and efficiently German staffed.

Meeting the Russians

Everywhere I went both in and out of Germany I was repeatedly asked about the Russians. Consequently, I made a special effort to ask about them myself and meet them. My first contact was in a jeep headed for Berlin at the entrance to the Russian zone at Helmstedt, 120 miles west of the city. Besides the jeep driver, a GI of Mexican origin from New Mexico, I was accompanied by Captain Robert Myers of El Paso. The international strip to Berlin is a double laned highway and the zone itself is just two miles wide, and we were warned to heed the markers to Berlin. The penalty for straying could be days or even weeks detention. To our own consternation we failed to take a proper turn and headed straight into the main Russian Potsdam camp. It was the most uneasy part of the entire European trip. After warning our driver not to stop unless shot at, we returned all Russian signals with friendly Texas hand waves and assumed everything else was all right. We waved greetings to the Russian WAC traffic directors, with their little yellow and red flags, one in each hand, and hoped we had the

The Potsdamer station portrays the ruination of Berlin transport by Allied air power. This general view shows the roof caved in onto tracks and the overall devastation.

Official U.S.A.A.F. Photo

high sign to keep on going. As we entered the American zone in the Berlin area, the GI sentry was flabbergasted to hear our tale.

In Berlin, I attended several meetings of the four-power sub-committee of the oil section. The Russian representative, Major Gregorovitch, is a scholarly man, pleasing disposition and courteous to a fault. His manners were impeccable, especially to the British representative, Mrs. Pauline Fenley, civil employe. Our own representative was First Lieut. George Dalferes, and for France, Captain Rochefort. At lunch I met many Russian officers, civilians and civilian-officer personnel both men and women. I found the officer class of Russians well educated and quite mannerly. The greatest handicap to closer relations undoubtedly is language and the authoritarian type of their own government. If Europeans and Americans generally understood a little Russian, even the alphabet, it would improve international relations.

Schools started reopening in Berlin last August, and in all zones, especially the Russian, earnest efforts to reestablish education are taking place. The Russians are offering Russian language courses, but I do not believe that it has been made mandatory.

Returning by automobile from Berlin 125 miles to Helmstadt, connection is made with the sleeper train to Frankfurt. Until November 16, 1945, no rail service had been established between the cities of Frankfurt and Berlin. The Helmstadt train, operating a weekly schedule, was reserved exclusively for Allied personnel. Frankfurt's railroad yards in the early morning light disclosed destroyed engines, burned out cars and twisted rails in one vast confusion of junk. One single rail line was cleared and restored to use.

From Frankfurt I was flown by European Air Transport Service (EATS) over Coblenz on the Rhine, over Brussels, Belgium, to Bovingdon airfield, 25 miles north of London. Many of the shattered Rhine bridges were plainly visible. The planes are handled entirely by the Army and are designed as a step from the regular army to civilian air travel lines.

Finding the first train and boat travel restored three days earlier to The Hague, I arranged a visit to the home of the former Shell manager of Roumania, J. Sonneveld, who, with his wife, lived the war out in Holland. The Hague suffered severely from a mistake in Allied bombing, ruthless destruction of private property for German fortifications, and lastly through starvation. The Germans fired many of their rocket bombs from parks in The Hague, using the city for their own protection.

Scheveningen, the once-beautiful seaside resort near The Hague, is seriously damaged and its beach is in terrible shape, marred by thousand of piles, mine fragments, embedded railroad rails and concrete walls and bunkers. The famous Steel pier was completely removed. The great hotels, The Grand, The Palace and the Orange, are battered and are partly destroyed. Hundreds of home were torn down to provide firing lines and room for tank maneuvers.

Starvation Rampant

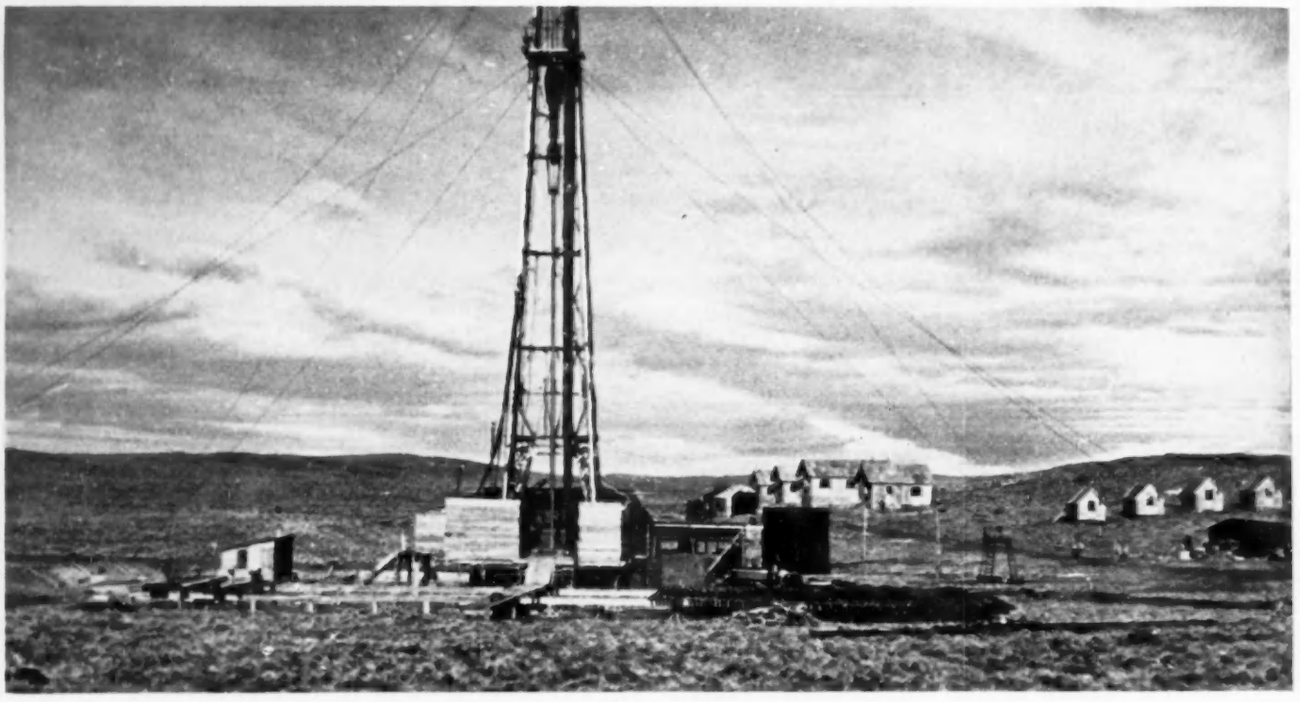
In the last six months of the war, tens of thousands of Hollanders died of starvation. Twenty-two out of every 1000 citizens died, an average of three times greater than for Great Britain. The bitterness of the Dutch toward the Germans is beyond words.

At Rotterdam, the center of the city is marked by a vast green pasture, representing the former site of large buildings and busy streets. The ruins are largely gone, but memories remain. The massive granite and concrete docks at Rotterdam were systematically destroyed, 17 miles of them. Their rebuilding will run into hundreds of millions of dollars and years of work. The removal of the hundreds of thousands of live mines scattered over the fields and beaches of Holland is proceeding with painful slowness.

On one Saturday afternoon, Sonneveld and I watched about 2000 children of The Hague, from five to 12 years old, waiting for a pre-Christmas visit of old St. Nick. We estimated that 20 percent showed the effects of acute starvation. The rest had recovered successfully.

Even today, all over Europe, England included, food, fuel and clothing are scarce and severely rationed. Eggs, tea, coffee, milk, citrus fruits and bananas are not to be had. Soap and fats are extremely scarce. Electricity in The Hague is rationed to 32 kilowatts per two-month period. Coal is obtainable in minute quantity only. Money is frozen in all countries, and in Holland even spending is strictly limited.

The return to the United States was by air, with the ATC from London to the Azores, to Newfoundland and New York. Using one crew only, it required stopovers in the Azores and Newfoundland. The most spectacular part of the return trip was the sight of Mount Pico, a volcanic cone of basalt and ashes, rising to 7640 feet in the western tip of the Azores. The most welcome sight, however, was still the Statue of Liberty in New York harbor.



Spring Hill 1 on Isla Grande, Tierra del Fuego, being drilled with rotary rig.

Chile's "Farthest South" Exploration

By J. ELMER THOMAS
Consulting Geologist, Fort Worth

THE "farthest south" oil explorations in the world are now being prosecuted by the government of Chile near Punta Arenas, on the Straits of Magellan, where two test wells are now being drilled. Together with some wells drilled in that vicinity about 15 years ago, these are probably the "farthest south" in history.

Since 1941 geological work has been conducted there under the direction of Glen M. Ruby and one party is still in the field. The seismic surveys were made by two crews of the United Geophysical Corporation of Los Angeles, and one crew, still at work, is expected to complete the job by April, 1946, the end of their "summer season" in that cold and windy district. The Livermore Corporation, of Lubbock, Texas, shipped a large rotary rig, capable of going to 11,000 feet and a Spudder cable outfit, good for 6000 feet down there last summer, and work began September 23, on a year's contract basis. The cable tools have been acquired by the Chilean government through its "Compañia de Fomento de la Produccion" (The Development of Production Company).

Additional tests besides the two under way will be drilled. Difficult roads are being built to the locations for the third and fourth proposed tests, which are supposed to be the best bets as promising structures.

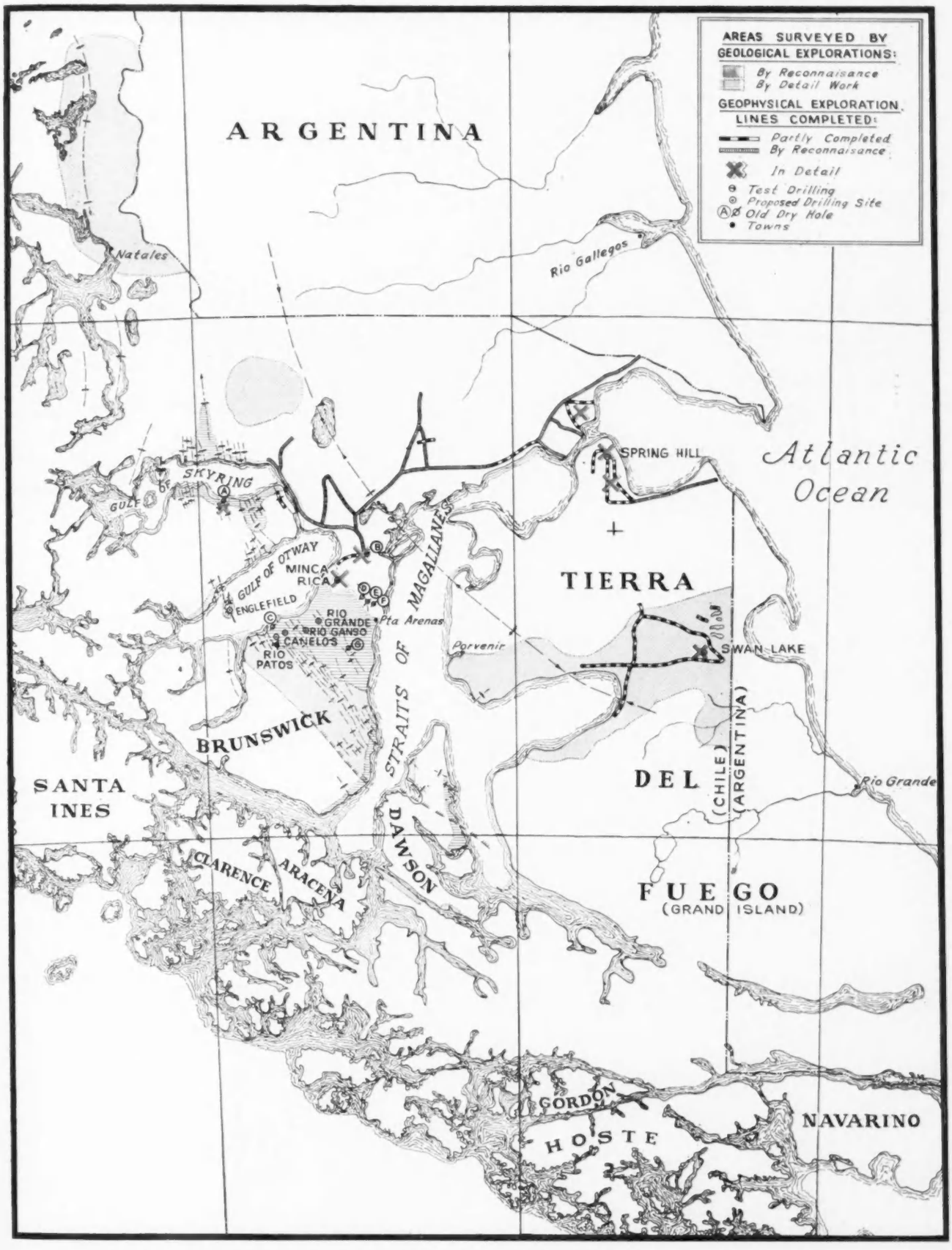
The exploratory work was largely geological on the Brunswick Peninsula, where outcrops can be mapped, but purely geophysical on the Isla Grande of Tierra del Fuego, which is covered completely by glacial drift. The main Andean Range lies approximately along the south end of the western boundary between Argentina and Chile and the Baldwin Range trends eastward below Argentina's south boundary. The accompanying map shows the southern tip of the continent, where the tests are being drilled in the Santa Cruz Basin. Nearest production is at Comodoro Rivadavia in the San Jorge Basin of Argentina. John Rich, in his paper, "The Oil Resources of South America," (A.A.P.G. Bulletin, May, 1945) gives the Santa Cruz Basin a top rank rating.

The territory under exploration is somewhat difficult to reach. The "Aera Posta" line of the Argentina government has planes to Rio Gallegos, a two-

Table 1. Data on Oil Tests Drilled in Chile

WELL*	Year Comp.	Depth (Meters)	Formation at Bottom	REMARKS
A	1937	650	Tertiary	Gas showings.
B	1941	920	Tertiary	.....
C	1936	1521	Cretaceous	.....
D	1936	1760	Tertiary	.....
E	1931	1170	Tertiary	Several oil shows. Made 5 tons from near 600 m.
F	1931	650	Tertiary	.....
G	1930	1390	Tertiary	.....
H	....	....	.....	Now drilling.
J	....	....	.....	Now drilling.

* See accompanying map for site of tests.
Note: One meter equals 3.28 feet.



Sections of Southern Chile surveyed by geological and geophysical parties and areas of present and past drilling.

Santa Cruz Basin of Southern South America, considered favorable oil territory. The two wildcats now drilling in Chile are in this Basin.

Unloading drill pipe at Punta Arenas.

W. L. Morrison, operations manager for The Livermore Corporation, at Mina Rica test, Brunswick Peninsula.

day trip from Buenos Aires, and a bus line makes Puenta Arenas the third day. On the Chilean side, Punta Arenas is a ten to 12 day trip by boat from Valparaiso, or a train can be taken to Puerto Montt, Chile, from which Punta Arenas is a five day trip by boat. The Chilean government is about ready to open a new airline making semi-weekly flights from Puerto Montt to Punta Arenas which will shorten travel time materially.

Numerous gas and some oil seepages had long been known in that area and some German geologists made extensive surveys there prior to World War I. Perhaps they were also mapping the water-ways and deep-water harbors, in which those passages abound. Some tests were drilled by the Chilean government in the late 20's and early 30's, all on the Brunswick Peninsula and near Punta Arenas, with negative results. Several tests reported shows of gas, and one had showings of oil in several horizons, from one of which 30 barrels were recovered. (See Table 1).

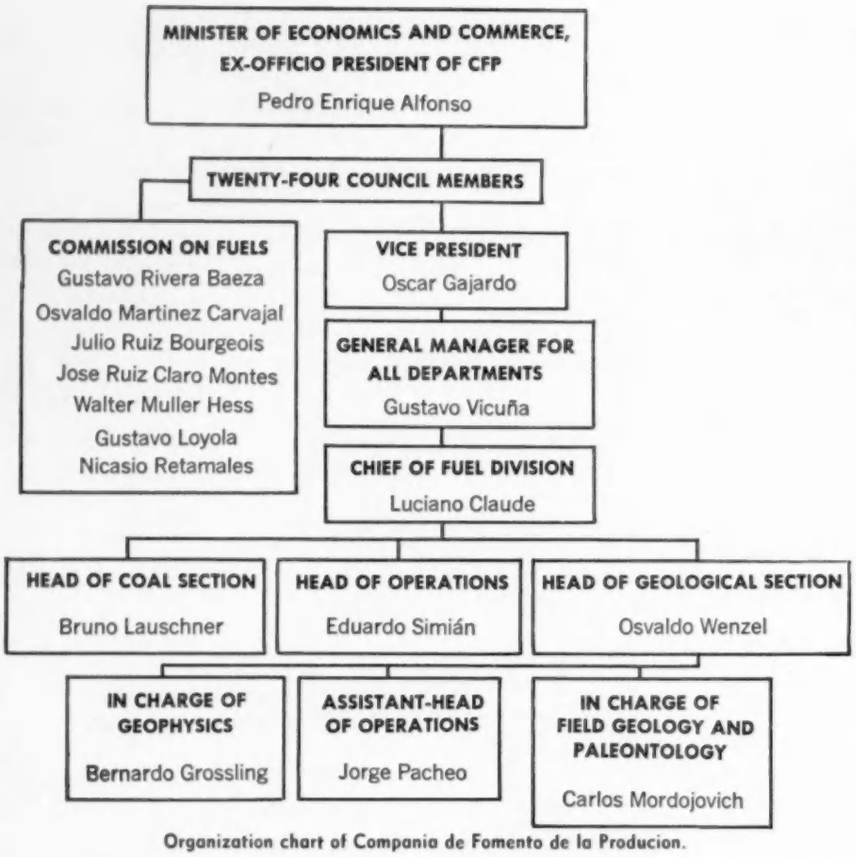
Since 1941 the Chilean government has spent upwards of 40 million pesos Chilean ($1,300,000 U. S.) on exploratory work and ten closed structures have been worked out to date. Spring Hill, where the rotary rig is drilling (below 6800 feet on December 11) may be carried to 11,000 feet if necessary. Being a purely seismological location, little is known about the stratigraphic section but production is hoped for in the Tertiary, or in the Upper or Lower Cretaceous, comparable to Comodore Rivadavia 500 miles north. Also on Isla Grande, locations have been made on the Little Spring Hill structure, a short distance south of the present test, and on the Seven Lakes (San Sebastian) structure, about 50 miles southeast and within ten miles of the Argentine border.

On the Brunswick Peninsula, cable tools are drilling (below 1900 feet on December 11) the Mina Rica structure and it is not expected to go deeper than 5000 feet. That Anticline, as well as Canelo, Rio Grande, Englefield and Punta Prat, a short distance southwest, are purely geological locations. On the three others, also on the Brunswick Peninsula—Rio Ganso, Rio Patos and Laguna Blanca (on the mainland)—supplemental geophysical surveys were made. Much work has been done on the mainland to the northwest, territory also lying within this Santa Cruz Basin, but so far no favorable structures have been reported there.

The Fomento contemplates an annual appropriation of 40 million Chilean pesos for the next several years, which should give the territory a good testing insofar as concerns the geological and geophysical prospects in this historic region, where Magellan in 1520 discovered the first water passage to the Pacific Ocean and where the major portion of the German Fleet is now believed to have remained in hiding during much of World War I.

In December, 1926, the Chilean Congress passed a law which asserted the exclusive rights of the government to explore for, develop and operate oil wells in that country. Just a year later, in December, 1927, it passed an act reversing that position by granting permission to the President to make oil concessions to private parties, domestic or foreign. Three companies, West India (Jersey Standard), Pan-American and Shell-Mex then applied for 500,000 hec-

Warehouse of the Mid-Continent Supply Company at the Spring Hill Ranch, Isla Grande, Tierra del Fuego, "the farthest south 'supply store' in the world."



Organization chart of Compania de Fomento de la Producion.

tares each, all in this Magellan district, but before any action was taken, in February, 1928, just two months later, the Congress reversed itself a second time by withdrawing permission for the government to grant oil concessions, which has remained the law ever since. There must have been two groups of differing views in the Congress at that time but since then no suggestion has been made openly that Chile follow the lead of other countries which have been so greatly benefitted by welcoming the advent of foreign oil companies with great experience and large funds to be applied in the difficult and costly field of petroleum exploration, especially in remote and inaccessible districts. At the present time there would seem to be no likelihood of opening the territory to exploration by others, at least not until the current drilling program has been carried through. If it proves to be successful, Chile probably will follow in the foot-steps of its neighbor on the east, Argentina, and attempt to develop its own oil resources up to the point of meeting its own consuming requirements, although Argentina has failed to accomplish that in 28 years of operations.

After the enactment of the "exclusion act" of 1928, control of the oil problem was transferred from the "Superintendence of Saltpeter and Oil" to the Department of Mines and Petroleum, and under its administration some additional drilling was done. In 1943, however, the entire matter was transferred to the Compañia de Fomento de la Producion. This organization presents a somewhat unusual phase of governmental intervention in commercial activities which is interesting to examine in these days, when several "labor governments" in other parts of the world exhibit a strong tendency towards socialization in numerous industries. The Chilean situation presents several points of difference with that in Argentina and Uruguay.

The government's wholly-owned corporation is named "The Company for the *Development* of Production." Initially its basic purpose is said to have been to engage in certain lines of activity necessary or important to the country's economy, but for a number of possible reasons the prospects for profit did not prove attractive to private capital. In this manner they have entered into several lines of business, not exercising any monopoly as its sometimes, but not always, the case with Uruguay's "autonomous entities," and sometimes not even competing with private companies in a true sense of the word. In this respect the corporation resembles some of the companies formed by the Reconstruction Finance Corporation during World War II, such as the Rubber Reserve, Defense Supplies, etc.

The Minister of Industry and Commerce is ex-officio Chairman of the Council of the Corporation, which consists of 24 men, not necessarily government officials but some quite active in private business. These are divided into sometimes interlocking groups, the Commission on Mines, on Agriculture, on Industry, on Energy (electrical) and fuels, on Transportation, etc. Under the advice and supervision of those groups are operating heads or managers. At the beginning of the coming year, Electrical Energy is to be placed in a separate corporation and the commissions on Mining and on Fuels will be merged. The setup then, as it affects petroleum exploration, will be as shown on the accompanying chart.

In 1932 laws were enacted which gave the government the right to engage in or even to organize a monopoly in petroleum refining and also in petroleum distribution. No action has been taken along those lines. Three small refineries, formerly operating on highgrade "topped crude" or unfinished gasoline, were owned by domestic companies but have been inactive for a number of years except for their grease plants. These are Compañia de Salitre with 300 barrels capacity at Iquique, Sociedad Establecimientos Fulimocos with 175 barrels at Vina Del Mar and Miguel Maritano with 75 barrels at Talcahuano.

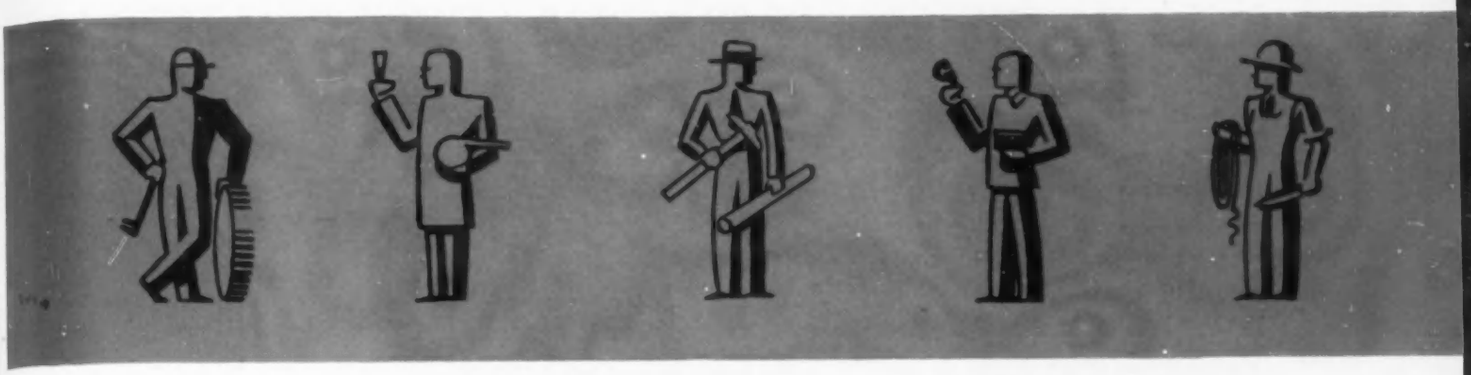
A domestic company, Compañia de Petroleos de Chile (COPEC) has about one-half the gasoline distribution, West India (Jersey Standard) about one-third, and Shell-Mex the remaining one-sixth. In spite of some products shortages, shipping scarcity and other problems due to war-time dislocations, Chile has fared rather well as to petroleum supplies, as shown by Table 2.

Some reduction in motor gasoline for non-essential uses was, of course, necessary, but the companies managed to furnish adequate supplies of all products, and especially fuel oil, for necessitous uses such as mining, transport and all war-time requirements.

Table 2. Importation of Petroleum Products in Chile
(Figures in Barrels of 42 Gallons)

	1940	1941	1942	1943	1944	1945
Gasoline all grades	979,000	1,143,000	981,000	747,000	837,000	923,000
Kerosene	78,000	103,000	117,000	94,000	105,000	122,000
Fuel Oils, including Diesel, and bunkers	4,688,000	5,242,000	5,595,000	5,640,000	5,479,000	5,688,000
All other Products	150,000	188,000	173,000	143,000	124,000	193,000
Total Imports	5,885,000	6,676,000	6,866,000	6,624,000	6,545,000	6,926,000

These men are on Lane-Wells pay roll . . . but



they WORK for YOU!

WITH the introduction of the Gun Perforator in 1932 Lane-Wells accepted the responsibility of providing Oil Operators with Services and Products to facilitate well completion, increase ultimate production, and lower production costs. The entire organization—Field Men, Engineers, Shop Employees and Officials—has worked closely with Oil Company Personnel to improve equipment and widen the scope of Lane-Wells activities to keep pace with the ever-increasing demands of the American Petroleum Industry.

Selective Gun Perforating

The development of the Lane-Wells electrically fired Gun Perforator with Controller and internal gun wiring made possible Selective Gun Perforating. Perforations could be made individually and spaced to achieve any desired pattern.

High Temperature Powder

Temperatures encountered in Deep Well Drilling range well above 300° F. Every known powder was tested to find a means of withstanding high temperatures with no decrease in penetration. Supplementing Lane-Wells research, development of military requirements has indirectly aided in the solution of powder problems.

Steelflo—Ogival Point Bullets

249 different bullet shapes and sizes were given extensive field and laboratory tests to develop Steelflo—the bullet that provides clean perforations, deeper formation pentration.

Measurement Correlation

Lane-Wells engineers perfected the Calibrated Line Measurement System to check accurately the careful measurement of drill pipe, tubing or casing in strain. No matter what measuring standards you have adopted, Lane-Wells can check them "on the nose."

Floseal - Packer Ring Sets

Developed to permit easy, positive Olympic Packer operation in the high temperatures and high pressures of the 20,000-foot wells of the future, Floseal Packer Rings assure superior sealing at shallow depths with light tubing weight or at extreme depths with tremendous hydrostatic pressure added to the tubing weight.

The whole hearted acceptance and cooperation of the country's oil well drilling and producing companies enables the Lane-Wells organization to continue "to render a constructive service, to keep ahead of the field through constant research and to place the best interests of our customers first at all times."

Tomorrow's Tools—Today!

LANE WELLS COMPANY

Los Angeles—Houston—Oklahoma City

General Offices, Export Office and Plant:

5610 S. Soto St., Los Angeles 11, California

24-HOUR SERVICE **35 BRANCHES**

The De Mares Concession

Church built for nationals at El Centro camp, with all expenses borne by the company.

Homemade multiple pumping power unit, in use more than 15 years, constructed from the De Mares scrap pile.

El Centro gasoline plant processes 16 million cubic feet of gas daily and in addition strips the product from the absorption medium from three field plants.

Production Hits

COLOMBIA, ranking eighth among oil producing countries, had produced 346,763,808 barrels of petroleum at the end of 1944, and during the year produced 22,387,508 barrels, all from two concessions, the De Mares and the Barco.

As 1945 neared an end these concessions were producing at a rate which would bring a total of more than 26½ million barrels for the year, an all-time high for Colombia. In addition, Shell's Casabe field on the Yondo concession, less than 30 kilometers northwesterly from the El Centro fields on De Mares concession, went into its exploitation period in the early part of June with first pipe line runs, and is contributing between 8000 and 8500 barrels daily to this total, or at the rate of approximately 4 million barrels a year. The Casabe figure is probably conservative, since nearly half of the field's 30 wells are shut in and most of the production is from flowing wells.

The De Mares concession alone has been responsible for almost 95 percent of the total cumulative production from the nation to the end of 1944, and at the end of August, 1945, was still producing 63 percent of the current output. Aside from being the greatest single source of petroleum in Colombia, the area is of great interest from the standpoint of operation. Tropical Oil Company, holder of the concession, has made it as self-sufficient as possible.

First Field

Situated in the great central area of Colombia known as the Middle Magdalena Valley, the concession is bounded on the west by the Magdalena River and north and south by the Sogamoso and Carare rivers, respectively, being 30 miles across at its widest east-and-west point. The town of Barrancabermeja is located on the concession toward its northern end. The first of the commercial fields in Colombia was opened on De Mares by Tropical Oil Company with

# of Colombia

By GEORGE O. IVES
Staff Writer

All-Time High

An example of the type of housing provided members of the El Centro administrative staff.

completion of its Infantas C-1, spudded February 27, 1918, and completed November 11, 1918. Initial production was at the rate of 2000 barrels of 30.5-gravity oil per day from what was later designated as the "C" sand of Eocene age. The well has since been closed in after having produced a total of 170,000 barrels. Subsequent drilling with complete definition of the Infantas field has shown it to be on a faulted anticlinal structure trending slightly east of north from the discovery well with a productive area about seven miles long and a mile wide. It was found to have two more producing zones in addition to the original discovery pay, the "A" and "B" zones, both in the Oligocene. However, the latter zones are relatively unimportant as regards volume of production and the principal output of the field is from the discovery zone. There have been 472 wells drilled in the field, of which 20 were dry holes and 452 producers, 10 of which have subsequently been abandoned. There is now only one flowing well in the field, and 275 pumpers. Twenty-nine are designated as high gas-oil ratio wells with the remainder shut down. Average daily production from the area at the end of August was slightly less than 9000 barrels.

Principal means of transporting equipment and foodstuffs.

Fault on East

The field is bounded on the east by a main overthrust fault, with minor east-and-west cross faults separating the field into a number of separate blocks, although the producing zone is more or less continuous throughout the area, having average thickness of about 400 feet.

About eight years later, in 1926, stains of oil in sand beds exposed during excavation near Tropical's main camp at El Centro resulted in discovery of the La Cira field, just northwest of Infantas and now considered a part of the whole general feature, with the two fields operated as one. This area differs somewhat from Infantas in shape and characteristics,

Brickyard at El Centro. Despite the heavily wooded country, very little timber is suitable for building, and brick from this plant is the basic material for the concession installations.

The International Club is the center of El Centro social and recreational activity.

although having about the same productive area—around 5200 acres. This field also is a faulted anticline with a main thrust fault on the east side, although this fault is overthrust to the east instead of to the west as is the case with Infantas. As at Infantas, the "A," "B," and "C" zones are present, with the latter the main producing section. A total of 709 wells were drilled on the La Cira structure, resulting in completion of 697 producers and ten dry holes. In this area a number of wells have been completed as dual-zone producers from the "B" and the "C." Depth to the top of the lower zone ranges with structure from around 2800 feet to as low as 4500 feet, with about 300 feet of penetration resulting in exposing an average of 150 feet of net producing sand. The Oligocene "B" sand overlies the Eocene pay about 1000 feet, and the Upper "A" zone is found at depths from 500 to about 1000 feet. The latter sand is thicker than either of the other two, but is found in only a small portion of each structure, and yields heavy, asphaltic base oil of about 20 gravity. Here, as at Infantas, most of the wells have gone on the pump and many have been shut in. The two areas are now operated as one unit, with no real segregation of production other than for types of crude. There are 876 producers, only three of which are flowing, and production is currently around 52,000 barrels from the whole area. There is a definite water drive from the west side with any shutdown of wells on the flank showing an immediate effect up structure. Decline curves for the Infantas area have leveled off at about 5 percent annually, with La Cira now at 15 percent, and overall for the two around 14 percent.

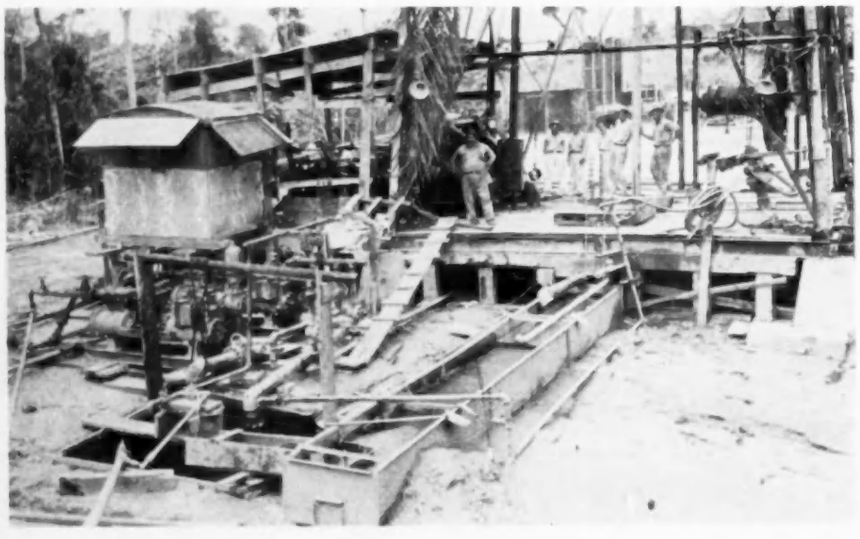
Operating Rigs

Three rigs are currently operating in the field, all of which are working on "B" zone wells for added output of low cold test crude. The production breakdown shows about 800 barrels of "A" zone crude daily, about 2000 barrels of "B" zone low-cold test crude, and about 42,000 barerls from the "C" zone. All of which come in through separate systems. Gathering systems include a system for the low cold test crude, one for high cold test which goes through a 10,000-barrel capacity dehydration plant, a clean oil system, and an emulsion system which can handle 40,000 barrels daily through the main dehydration plant at El Centro.

The pipe line outlet is through Andian National Corporation's line originating at El Centro and terminating at the Mamonal terminal near Cartagena on the Caribbean Sea. This was originally a ten-inch screwed line 334 miles long, which has been stepped up with 12-inch welded loops until it is in effect two lines with nine pump stations. Capacity is 57,000 barrels daily, and at present it is handling production from Shell's Casabe field in addition to the De Mares crude. An average of 14,000 barrels daily of Infantas and La Cira crude is processed in the Tropical Oil Company's refinery at Barrancabermeja, with refined products going out by barge with the exception of 100,000 barrels of Navy fuel which during the early part of this year was being batched to the coast through the pipe line.

Several fault blocks in the field are being repressured with encouraging results. The wells in the field produce at gas-oil ratios averaging 1600/1, and casinghead gas is gathered and processed through five gasoline plants in the field. All of the plants are of the absorption type and have a combined capacity of 70 million cubic feet of gas daily with an average recovery of 1.89 gallons of product per 1000 cubic feet of gas.

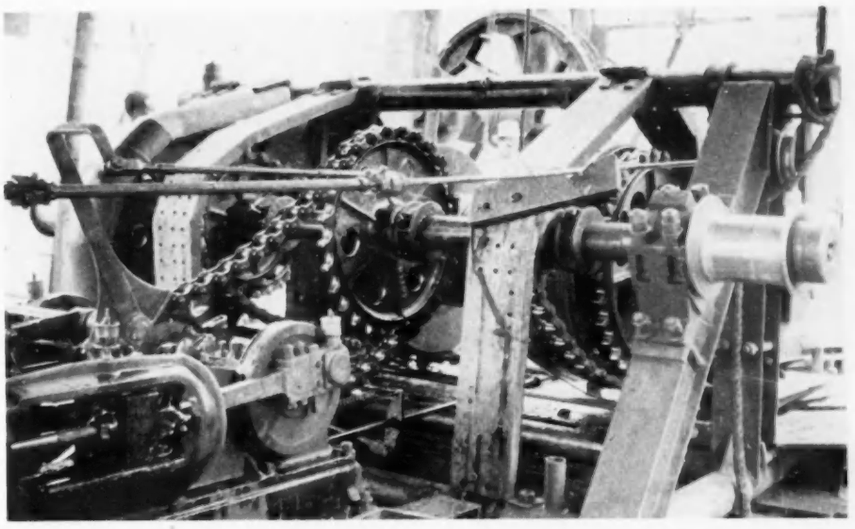
The setup includes the main plant at El Centro with three of the field plants operating on remote absorption from the El Centro plant. The absorption medium is pumped from El Centro through the three such field plant absorbers and is returned to El Centro for



Drilling a semi-exploratory well in the La Cira area. No serious mud problems are encountered and little control is necessary.

stripping and circulation back through the field absorbers. The El Centro plant in addition completely processes some 16 million cubic feet daily. The fifth field plant is a complete absorption and distillation plant within itself, but the raw gasoline product is pumped in to the El Centro plant for stabilization. One primary aim of the plant is to supply the refinery at Barrancabermeja 26 kilometers away with stable gasoline for blending and making motor fuel. With requirements of eight to 14 pounds Reid vapor pressure, it supplies about 85,000 gallons daily from the middle range. The plant also makes a special six-pound product for 90-octane aviation base gasoline. Operators have even found it possible in this plant to undercut in distillation units to 240 end point.

Excess butanes, which amount to 45,000 gallons daily, are pumped into the main crude stream.



Draw works of this type, staffed by Colombian crews with Colombian tool pushers, have been performing efficiently for many years in the Infantas and La Cira fields.

Railroad Built

Tropical has constructed a railroad from Barrancabermeja to El Centro, in the center of the producing area. This narrow-gauge artery supplemented by a road also built by the company, moves all heavy equipment and supplies into the field area. Twenty-six kilometers in length, it is completely equipped with rolling stock, including steam locomotives, passenger coaches for transportation of personnel, freight cars, flat cars, cars for sand and gravel, and even refrigerator cars for fresh meat and vegetables. In addition the company operates automotive type speeders and ambulances over the railroad. All equipment is maintained in perfect operating condition in the company's own repair shops.

The only means of transportation for heavy equipment and supplies in bulk from outside supply sources is the Magdalena River, and for this purpose the company operates a fleet of stern-wheel river steamers and barges. These operate largely between Barrancabermeja and the tidewater port of Barranquilla, although up-river trips are made with gasoline, diesel fuel, kerosine, lube oils and other refined products to the Medellin and Bogota areas. With the exception of a small area aroun Cucuta in the extreme eastern portion of northern Colombia, the entire petroleum products demand of the country is met by output of the Troco refinery at Barrancabermeja. Notwithstanding the size of this river, which rivals the Mississippi, it is not navigable except by shallow-draft river boats of conventional type, and even these are at the mercy of changing weather and riverbed conditions. Much time is lost in freeing the boats from sand bars and mud banks, and when the water is low, certain portions of the river cannot be traveled.

Being one of the first extensive producing operations in South America, and in an isolated locality, with most ordinary phases of operation multiplied in difficulty, the concession has been one on which the company has had to learn by doing. It has learned its lesson well and over a period of years has instituted all of the features now to be found in the modern oil-field installations throughout Colombia and Venezuela, with some which companies operating in other areas do not find necessary.

Care of Employes

One of the first lessons learned was that it must take care of its employes. This is being done in a manner in which it would be difficult to improve. The company's staff consists of about 165 foreign members and 3000 Colombians. The task of housing and feeding these, plus their families, was enormous in view of the rugged jungle country. A constant fight is waged against malaria and other tropic maladies, and the uncertain supply lines have made the operators of the concession experts in improvisation. They have learned to convert one type of equipment to other uses. They have learned to build substitutes for materials, and during recent years when uncertainty as to whether they were about to be forced to relinquish the concession precluded purchase of expensive new equipment, they have done much complete manufacturing on the ground.

The educational program for children is provided for by the installation of schools located throughout the producing area so that workmen's children will be able to attend classes conveniently. Seven schools are located in the field area to take care of nearly 400 pupils. A program of education calls for four years of schooling at company expense, all teachers and supervisors being paid by the company and the whole system subject to the approval of the national educational system. The schooling embraces the primary and elementary grades corresponding approximately to the same grades in the United States school system. Schools for children who have completed these elementary courses are now being held up because the company must relinquish the concession in 1951. At present many children are being taken care of in manual training and vocational classes. A system has been set up whereby 18 students selected for outstanding scholastic achievements each year receive scholarships to schools in Medellin or Bucaramanga. Teachers are approved by the government, and are paid salaries ranging as high as 4.90 pesos daily, on a basis of seven days a week. The curriculum includes grading for students in religion, mathematics, grammar, social science, natural science, singing, conduct, personal application, personal appearance, and attendance.

Hospital facilities are excellent. The main hospital is at El Centro with a smaller unit at Barrancabermeja to take care of staff and workers at the refinery, terminal, and marine department. The more serious cases, requiring hospitalization for any length of time, or surgical work, are all handled in El Centro. Under the direction of Dr. J. F. Galloway a system is in effect which takes care of the workmen from the moment of employment until termination of connection with the company. Three doctors and a special nurse are at the Barrancabermeja unit, with a larger staff at El Centro consisting of one foreign doctor, four Colombian doctors, six foreign nurses and 12 Colombian nurses. In addition, there are six

Pumping jacks built from discarded materials, mostly three and four-inch pipe. With homemade multiplier shown in the background, stroke can be varied from less than 12 inches to more than 48 inches with no charge in stroke from power unit.

technicians on the laboratory staff at El Centro, and all tropical diseases are confirmed in the laboratory, which is complete in every detail.

Prospective employes undergo a careful examination They are first checked for missing members or other physical defects, including scars from accidents or injury sustained before entering the company's employ. Examination includes check for hernia, varicose veins, blood check for malaria or anemia. If they pass this far they are given Kahn or Mesini blood tests, eyes are checked, X-rays taken to search for tuberculosis symptoms, and heart and artery examinations given. Only then are they acceptable for employment. The tests are registered on a card which records all visits to the hospital, causes, diagnosis, treatment, results, and furnishes a complete clinical record which may be reviewed at the time of the termination of employment with the company. At this time an examination by at least two doctors is required to ascertain whether injury has been sustained which might justify compensation. Medical work needed at the time a man leaves the company is done. Records show that 17,583 persons have been hospitalized here. This does not include clinical examinations and prescriptions for various minor ailments, which total about 5000 per month. The service is rendered to members of an employe's family as well as to himself, and records show a ratio of three family treatments to one employe treatment.

Complete facilities are available to take care of any type of case. There is a ward which will accommodate nearly 50 cases of non-communicable ailments. In addition there are isolation wards in separate buildings for contagious diseases. The hospital also has private rooms, two to four-bed wards, and even a maternity ward. In addition to a completely equipped operating room there are two emergency and treatment rooms for cases such as small broken bones, tonsillectomies, etc.

The isolated location and uncertain supply situation have made it necessary to carry huge stores of all types of supplies, to the extent that two separate warehouse buildings had to be provided for storage. This includes everything from epsom salts to yellow fever serum. In addition there is a separate building for child care, with accommodations for 15 to 20 children.

Recreation Facilities

Recreation is taken care of by construction of club buildings for both foreign staff and nationals. Both are completely equipped for all social activities, and are used for showing motion pictures. Clubs have bars, billiard tables, and bowling alleys. Recreation fields are built and maintained for outdoor activities. A beautiful golf course has been built at El Centro, with another at Barrancabermeja for the refinery staff. The company runs passenger trains which furnish free transportation to employees who wish to go from El Centro to Barrancabermeja over the weekends. In this area the company works eight-hour days with a half day on Saturday, starting work at 6:30 in the morning with lunch at 10:30 and ending the day at 4:00, giving several hours of daylight after work for recreation and other outside activities.

The company has attempted to control inflation to some extent by freezing prices at the commissary in El Centro and at the refinery at levels which prevailed in early 1944. This system has enabled employes to continue purchasing foodstuffs, clothing, and incidentals at very near prewar prices, at a cost to the company of many thousands of dollars per month.

Fresh meat alone costs the company approximately $2000 per month in losses due to freezing of prices. The operators maintain their own herds of cattle for dairy and beef use, and slaughter an average of 300 head a month. In selling to employes through the commissary they sustain a loss of approximately 100 pesos a head.

The Colombian Supreme Court earlier this year rendered a decision sustaining Tropical's claim to the concession until 1951, but there has been no definite provision made for extension of time after that date. Sould no extension be granted the entire property with all installations will revert to the government. Under these conditions the company has been sparing of capital expenditures, and in endeavoring to keep operating at efficient levels, has become adept at improvising and manufacturing with materials at hand.

No Scrap Pile

The prewar scrap pipe has been reduced almost to zero. The foundry, which is capable of handling castings up to 1800 pounds, has been called upon for steady duty. A couple of years ago, after failure of a cylinder on a gas engine, threatening curtailment of operations through the gasoline plant through inability to get shipment of spare parts, the patternmakers worked up a set of patterns for the entire cylinder, the parts were cast in the refinery, machined in the shops, and the whole unit placed in operation. So successful was the emergency job that the company has now started making all its cylinders, and manufactures other equipment from cast iron or steel. The foundry is equipped with an electric furnace and a metallurgist on the staff has found it possible to produce almost any type of steel needed in their operations. The scrap pile has been inventoried and classified as to iron and steel specifications for melting, casting, or forging under the big steam hammers. Tool joints are carefully cut from wornout drill pipe and kept separately for their alloy properties. An interesting job

THE BAKER PORTABLE HYDRAULIC KELLY AND PIPE STRAIGHTENER

which utilizes the principle of the hydraulic ram, applying the force built up by a manually operated pump to the bend or kink in the Kelly, drill pipe, or drill collar. It is readily portable (the entire unit weighing only 1,200 pounds) and is brought to the rig on any small pick-up truck or trailer. It is quickly set up on the rotary table by using the cat line, and the straightening is done with the Kelly, or pipe, hanging in its normal position.

DON'T LOSE TIME AND CAUSE MORE KINKS HAULING A KELLY AROUND

Probably more Kellys are bent during transportation, and in being laid down and picked up, than from any other cause. Frequently a Kelly that has just been straightened in the shop will again be bent while taking it back to the well, rolling it off the truck, and dragging it into the rig. — It is much faster, easier and safer to take the Baker Kelly Straightener to the well. On isolated locations, or in foreign fields, it is almost indispensable.

POWERFUL AND LONG LASTING

Force sufficient to straighten 8¾" diameter drill collars can be built up readily by manual operation of the pump, which develops 95 tons pressure. It is ruggedly built and safe to use. The only parts subjected to wear are inexpensive and easily replaceable. The body and pump will last indefinitely.

YOU REALLY NEED ONE

if you are drilling oil or gas wells, because bent or kinked Kellys and drill pipe are a definite hazard. The Baker PORTABLE Kelly Straightener makes it so easy and so safe to straighten them that there is no reason to "take chances." — Ask any Baker office or representative for details and prices.

BAKER OIL TOOLS, INC.

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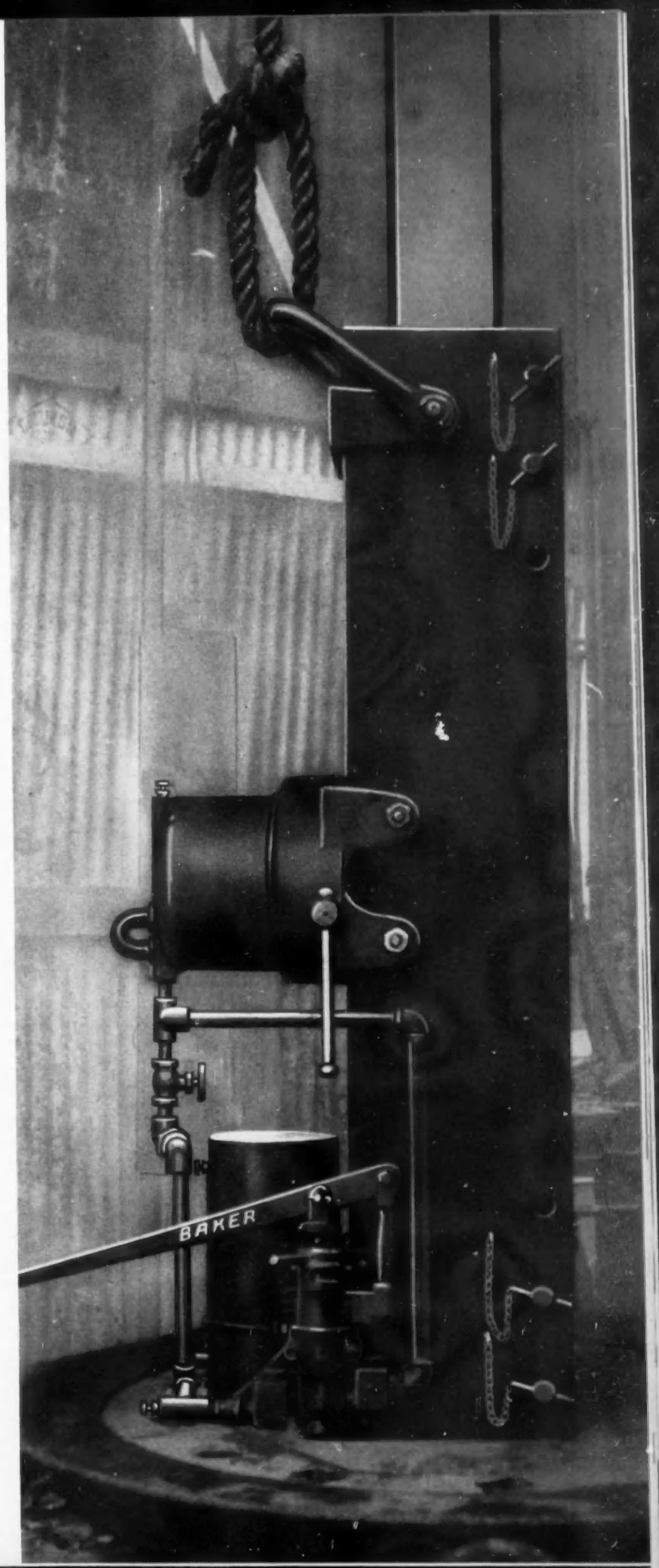
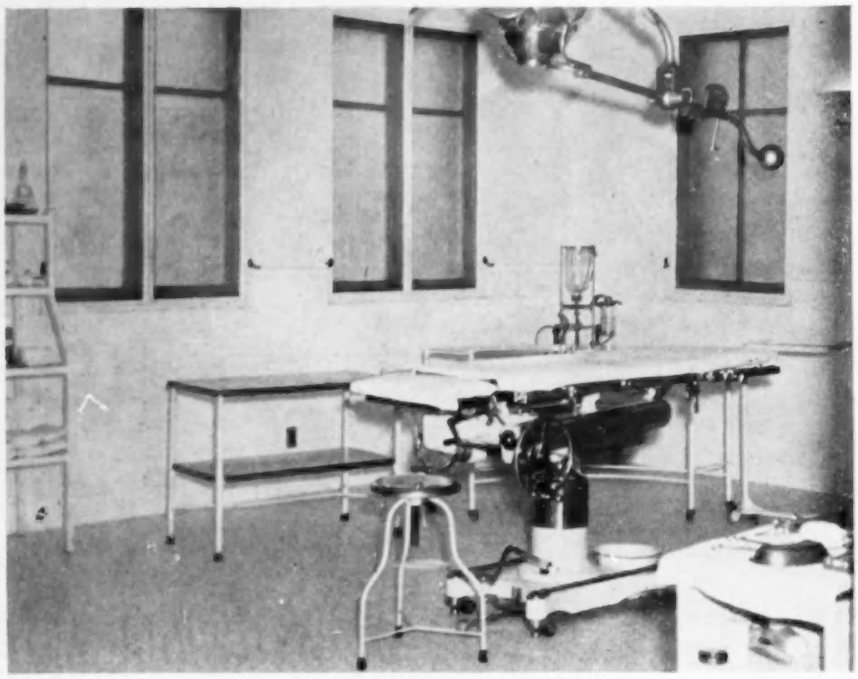


BAKER KELLY STRAIGHTENER



Completely appointed operating room at El Centro hospital

turned out by the foundry and machine shop was done at a time when one of the river steamers was incapacitated due to rupture, for about half its 8-foot length, of one of the huge steam cylinders which drive the paddle wheels. After all efforts to secure a new cylinder had failed, the problem was turned over to the engineers. Since the foundry could not handle a casting the size of the full cylinder, which weighs about 3500 pounds, a pattern was made corresponding to the half-cylinder which had failed. It required the combined capacity of the cupola and the electric furnace to handle the metal, but the casting was successfully poured. It was then necessary to partially dismantle one of the 24-inch lathes, the largest in the shop, to take the huge casting, but this was also done successfully, and the new part was welded on. After reboring and building a new piston it was placed in operation and has functioned perfectly ever since. It has been in operation more than a year and a half.

Using old tubular goods, scrap pipe, etc., the company has constructed pumping jacks which worked with such efficiency that they have been standardized. Of course there are many manufactured items in use in the field, but performance of the improvised equipment has been highly satisfactory.

Power Units Built

Several power units for pumping several wells with one motor have been built using parts of old steam engines and discarded rotary tables. The rugged nature of the country precludes wide use of the massive outfits which will pump many wells from central power, although there are two such uits in the field which operate 18 wells each.

The field is completely electrified, using electric power for all pumping wells and gathering station pumps. Power is supplied from a 5000 kilowatt condensing steam turbo-generator, which is normally able to handle the peak load which approximates 5000 KW, although the power plant contains in addition, three 1000-KW non-condensing steam turbine driven generators for stand-by duty, and they would be able to handle the necessary load for continued field operation in the event of emergency.

The relatively shallow production in the field makes it possible to drill with fairly light equipment, and Tropical does all of its own logging, cementing, and perforating. For exploratory operations 136-foot derricks are used while field drilling derricks are 122-foot structures. Eighty-four foot derricks are used for pumping wells.

Using light draw works, 10x10 drilling engines, and 12x6¾x14 pumps wells are completed in about two weeks to average depths of 4500 feet.

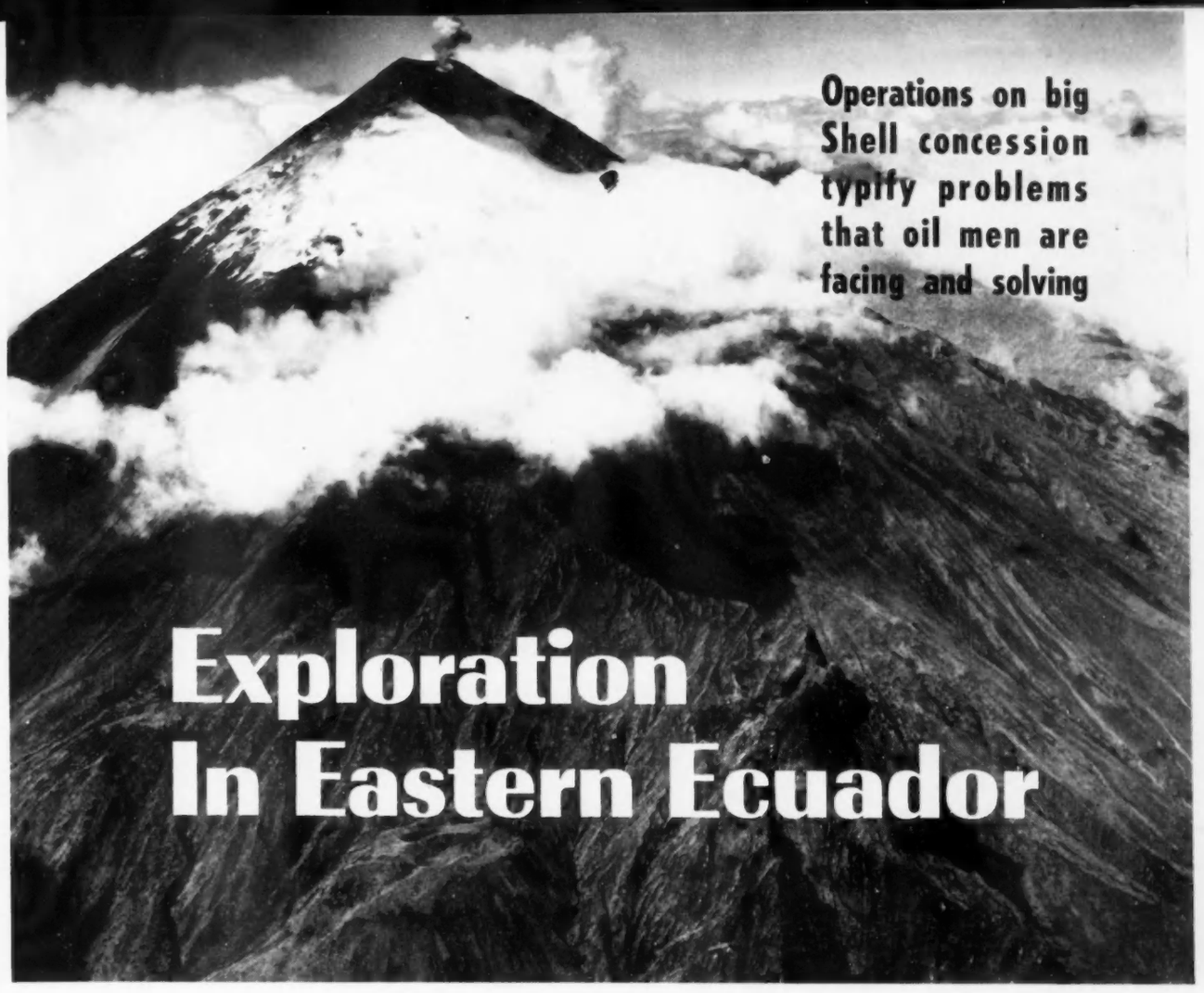
A number of other prospects have through the years been worked out on the concession, all being of the same general type as the two commercial producers, and all trending southerly from the El Centro area in line with Infantas and La Cira. There have been six wells drilled on the San Luis anticline, seven on the Colorado, and four on the Mugrosa structures, with some production having been developed at each, although they are now depleted and abandoned. San Luis was opened in 1926, the same year as La Cira, but the extent of development was reached with three producers which yielded only 7995 barrels cumulative production. Colorado had five producers but only made 1900 barrels, while Mugrosa produced 69,838 barrels from its three producers following discovery in 1929 before being abandoned as non-commercial.

New Field Opened

A new field was opened in August, when Tropical Oil Company's Calan 1 was completed on the east bank of the Magdalena River, adjacent to the company's refinery. No other wells have been drilled here, and the well which was said to have tested for a potential of 1500 barrels daily, has been shut in for market outlet. The oil is heavier in gravity than the common stream from the other production, and compares with the oil from Shell's Casabe field on the Yondo concession directly across the river. It is conceded to be on the same structure as Casabe. It probably will receive rapid development, since the company must exploit it to the fullest extent possible in the short time remaining before the concession reverts to the government.

Under a contract of transfer in 1919, Tropical was required to install a refinery within the limits of the concession, and within two years from signing of the contract, with capacity sufficient to meet the needs of the country, and to sell petroleum products at all times at prices not to exceed the prices for crude and products in New York. A small refinery was completed in September, 1921, which took care of early needs, but the present installation was built in 1936, including a unit with two towers, one to work at atmospheric pressure and the other at a vacuum of 28 inches of mercury. Capacity of this unit averages under normal operation, 12,000 barrels daily, but it can hadle as high as 14,000 barrels. It supplies all of the country's needs with the exception of what portion of the demand is filled by Colombian Petroleum Company's small 700-barrel refinery near Cucuta. Products from the refinery include aviation gasoline, motor gasoline (leaded and unleaded), naphtha, kerosine, lubricants (automotive and industrial), cleaning fluids, tractor fuel, fuel oil for engines, fuel oil for boilers, and asphalt.

Shipment of products to distribution points is almost exclusively by river barge and boat. The plant has full facilities for packaging of products, and for the building of crates and cases for their shipment.



Operations on big Shell concession typify problems that oil men are facing and solving

Exploration In Eastern Ecuador

Sangay Peak, an active volcano, 35 miles from Shell-Mera

By J. ELMER THOMAS

THE operations of Shell on its 25 million-acre concession in Eastern Ecuador present a good example of the problems to be solved and the obstacles to be overcome in such undeveloped, almost unpopulated, areas.

Inaccessible rather than remote, the concession extends from a point only 50 miles from Quito to about 200 miles farther east. Its exploration and development would have been almost out of the question without airplanes. Quito, the nation's capital, 9300 feet above sea level, is in the north-south intermontane valley which divides the Eastern and Western Cordilleras, and is itself near the very headquarters of the Amazon drainage system which flows into the South Atlantic. The concession starts in the Andean foothills and in a short distance is down in the meandering streams of a mature drainage pattern midst swamps and jungles.

The climate is fairly pleasant, in spite of an annual rainfall of 150-200 inches. Such a rainfall, however, naturally hampers flying, both for the transportation of materials and for reconnaissance work. One ten-months period contained only 55 or 60 hours of time suitable for aerial photography.

Natives No Help

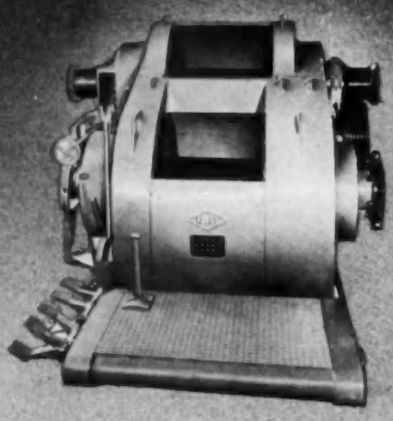
The concession was granted in 1938, and field work began in 1939. Almost a trackless jungle, its only inhabitants—outside of a few frontier settlers and priests—were the furtive Aushiri Indians, addicted to poison-tipped arrows. They are nomadic, altthough they plant some crops in poorly developed, temporary clearings. The soil is depleted in a year or two and they move on to occupy another clearing. Such people are not suitable as guides or bearers and other native labor has to be brought in.

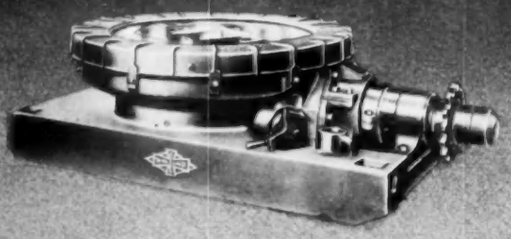
Some exploratory work is done along the rivers, but the best geological exposures are in the foothills belt, where "braided streams" are difficult to navigate. In the short distance of 60 miles the river had descended from an elevation of 8400 feet above sea level at Ambato on the railroad, to only 3000 feet above sea level at Shell-Mera. Since there was a road from Amabto leading down the Pastaza Valley to a small settlement at Mera and military outpost at Puyo, Shell established a camp between them.

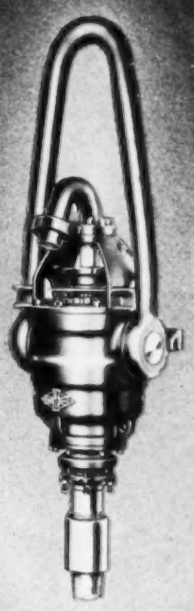
Geological reconnaissance from the air and detailed work on the ground, supplemented by seismic surveys, soon disclosed some structures in the foot-hills belt and the Vuano Anticline was selected for the first test. While only 30 miles from Shell-Mera, air transport seemed to be the best method of bringing in materials and a forward base was constructed, with camp and landing strip. The Vuano 1 is about five miles northeast of Arajuno.

For materials and supplies the railroad can sometimes be used from the port of Guayaquil to Ambato, a distance of 230 miles, and this railroad is one of the most remarkable engineering feats in the world, climbing up the west face of the Andes to elevations of 8000 feet and more in a very short distance. This

Wheland-Lucey Drilling Equipment







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TYPE "CS".....5000 ft.
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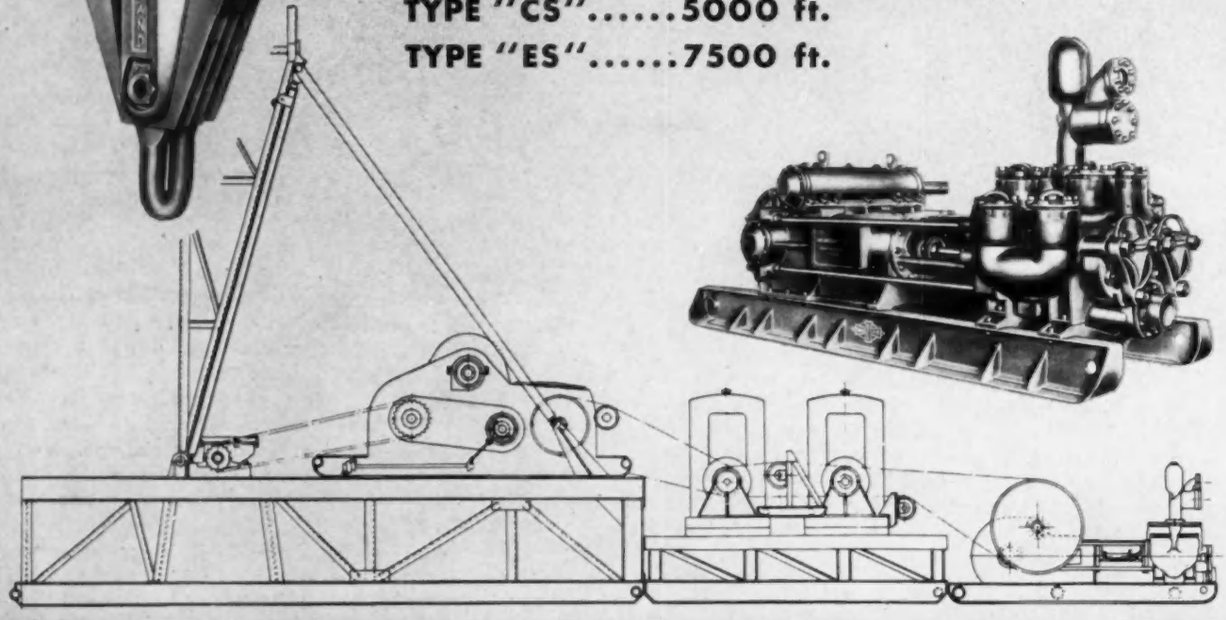

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railroad, however, is the "life-line" for all of Ecuador except the coastal strip, and it cannot always care for all of Shell's freight promptly. In such cases Shell utilizes barges and launches for river transport, carrying materials as far inland as possible and then loading them on the railroad to Ambato.

Supplies and equipment are then trucked down the Valley of the Pastaza to Shell-Mera, a distance of about 70 miles, mostly down hill. Planes are then used for the 30 mile hop to Arajuno, the forward base.

Shell's Vuano 1 has been abandoned after a series of unsuccessful completion attempts in both the Upper and Lower Cretaceous. Total depth was 5187 feet with pipe set near the bottom. Perforations were made at 5000-35 feet and at the base of the Hollin sand at 5175 feet, but both tested fresh water with some oil. The hole was then plugged back to test some horizons in the Napo Limestone but these tests also failed.

The geological section was not unknown because this general vicinity had been explored and studied in 1921 by Theron Wasson and Joseph H. Sinclair, who reported on it in their classic paper, "Geological Explorations East of the Andes in Ecuador" (Bull., AAPG, Dec., 1927). They had noted some seepages in the Napo Limestone and adjacent formations and these were the objectives of Shell's Vuano 1.

Enough encouragement seems to have been afforded by the test to warrant two others. The No. 2 will be six miles north of Vuano 1, while No. 3 will be 12 miles southwest of the Arajuno landing strip. This will require some road building which has been contracted by McGraw-Warren. This road will then be carried through to connect Arajuno with the main camp at Shell-Mera, if production is obtained.

Site of Shell concession and exploration in Eastern Ecuador

Preparations are also being made to drill about 60 miles due south at Ayuy, another foothills structure worked out by the geologists and checked by seismic surveys. This likewise will require airplane transport. A landing strip there is already being constructed. The location is in the neighborhood of a tribe of head-hunters who have the custom of shrinking skulls of the dead, as has been described by travelers in the Upper Amazon regions.

Pastaza Valley, near Banos, down which all material is trucked from Ambat on the railroad to the camp at Shell-Mera

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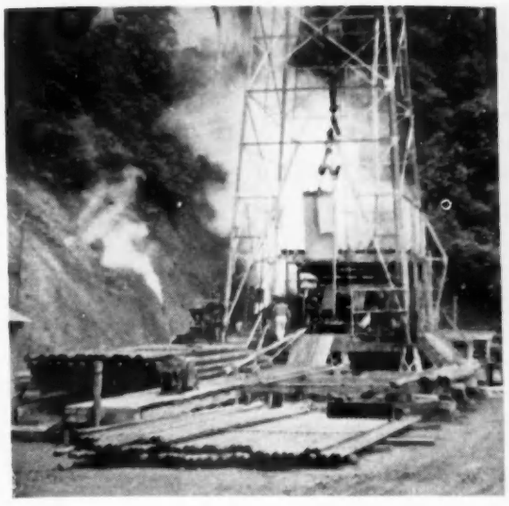
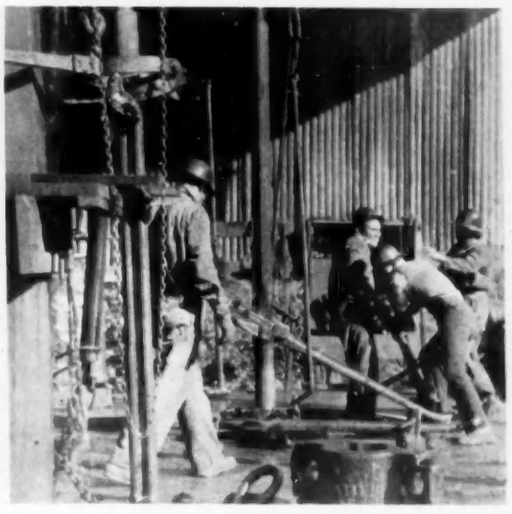
Bolivia's Oil Situation



Left, rotary rig operated by the government in the Bermejo field.

Right, drilling well in the Sanandita field.

(Photos courtesy of Institute Sudamericano del Petroleo)



Local demand dictates production total in a nation landlocked and sparsely settled

By J. ELMER THOMAS

SINCE 1937 Bolivia has operated its own oil industry as a state monopoly, through the "Yacimientos Petrolifera Fiscales Boliviana" (Government Oil Fields of Bolivia), a name copied from the Argentine government's oil company. The earliest exploration and development, in Southern Bolivia, had been conducted by Standard Oil Company (New Jersey), but some differences between the government and the company led to a sale of the properties, for $1,750,000. The company withdrew from the country and the government took over all operations, exploration, producing, refining and marketing.

Oil in the South

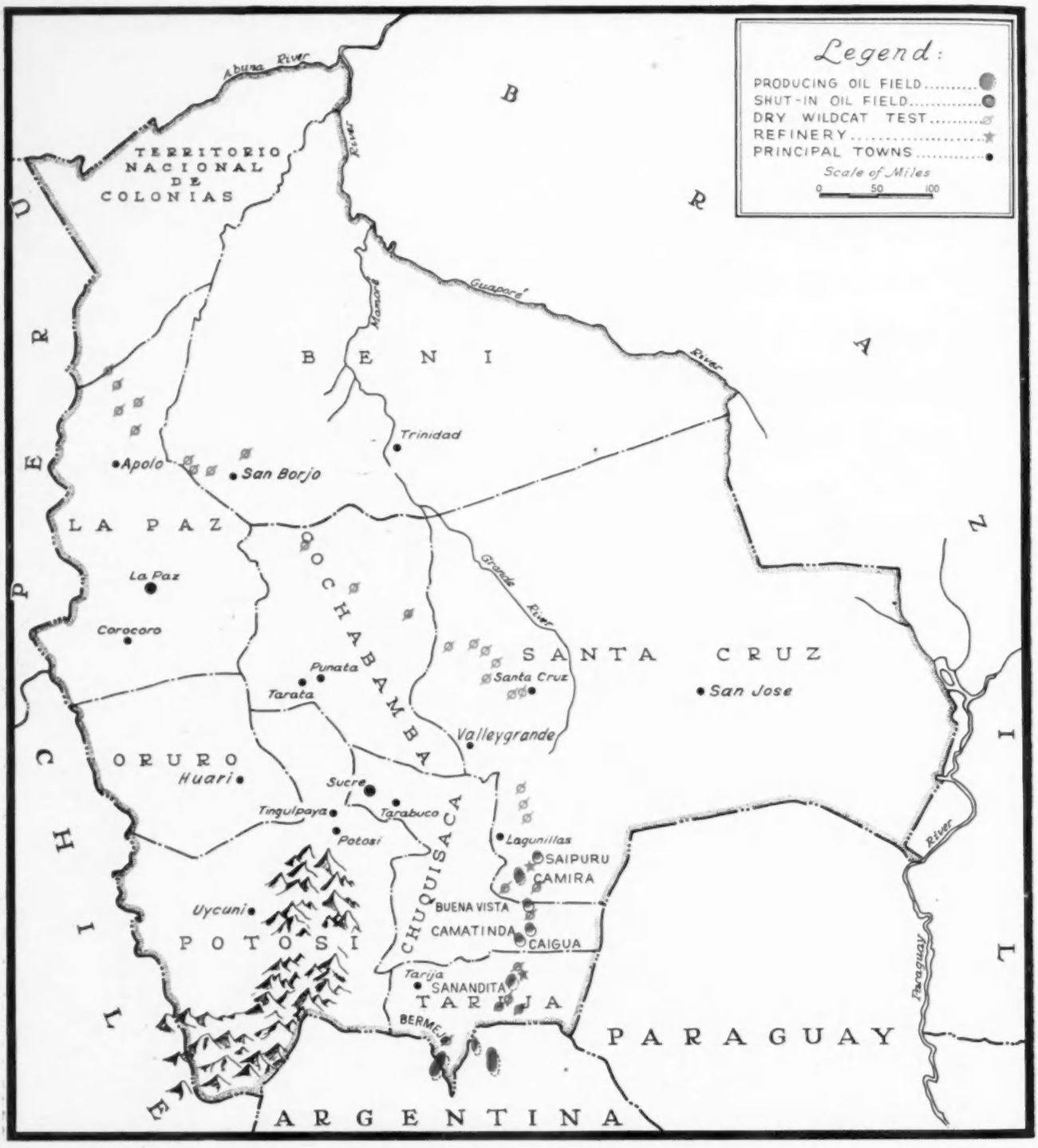
The oil fields presently developed in Bolivia are in the extreme southern part (see map) adjacent to the Argentine fields of the Salta district. In fact, Bolivia's largest field, Bermejo, is a part of the same producing structure which, on the Argentine side of the border, is called Agua Blanca and is operated by Standard Oil. Bolivia's active oil fields are Bermejo, Sanandita and Camiri, and there are three others indicated by single wells, shut in but considered to be "commercial producers." These are Caigua, Camatindi and Buena Vista. A seventh area, Saipurú, furnished a producing well when completed by Standard many years ago, but was plugged for lack of a market.

Well being drilled with portable machine in the Sanandita field.

Bolivia, like Paraguay, is a completely land-locked nation. Furthermore, it lacks a port on a readily navigable stream, such as Paraguay's capital, Asuncion, on the Paraguay River, which flows into the Paraná River, which empties into the Plata Estuary. Also, Bolivia is sparsely populated and lacks substantial industry, except for the famous Patino tin mines. Its sole railroad, cutting across the southwest corner of the country, comes up from Salta, Argentina, to Bolivia's capital, La Paz, situated 13,000 feet above sea level, with mountain peaks nearby which reach 18,000 to 20,000 feet. The rail line also connects with Arica, Chile, on the Pacific Ocean, which serves as Bolivia's port.

Market Problem

The principal problem of oil in Bolivia is the question of markets and mostly domestic markets, which are slender. If a large potential production could be built up in Southern Bolivia (which would require much capital) and if the crude markets of the world needed supplies badly enough, a pipe line might be built across Northern Paraguay and river barges used to bring Bolivian crude oil to tide water. Until that time comes, it is a question of supplying local



Bolivia's oil fields and exploratory efforts

petroleum requirements, with a little crude shipped south into Argentina, and perhaps, eventually, when railroad transportation is available, some products exported to the Matto Grosso District of Western Brazil, another sparsely settled area.

1944-45 Production

Camiri and Sanandita are served by small skimming plants of 630 to 750 barrels capacity daily, not operated at capacity during 1944, and most of the crude from Bermejo moves southward into Argentina. The output of the wells and the operation of the refineries are predicated principally on current local demand and hence the production statistics do not reveal the potential outputs. For 1944, the daily average production, in barrels of 42 gallons, was Bermejo 321, Sanandita 280, and Camiri 257. Substanial increases were scored during 1945, however. The figures for September were Bermejo 618, Sanandita 310, and Camiri 412. The possibilities of Camiri have not been fully realized and a 30-well drilling program has been planned for that field as soon as materials and equipment become available. Camiri has 5 or 6 wells, Sanandita about 15 and Bermejo 12 wells.

These oil fields, 3 active and 4 idle all in Southern Bolivia, as well as numerous structures and oil seepages extending northwest to the Peruvian frontier,

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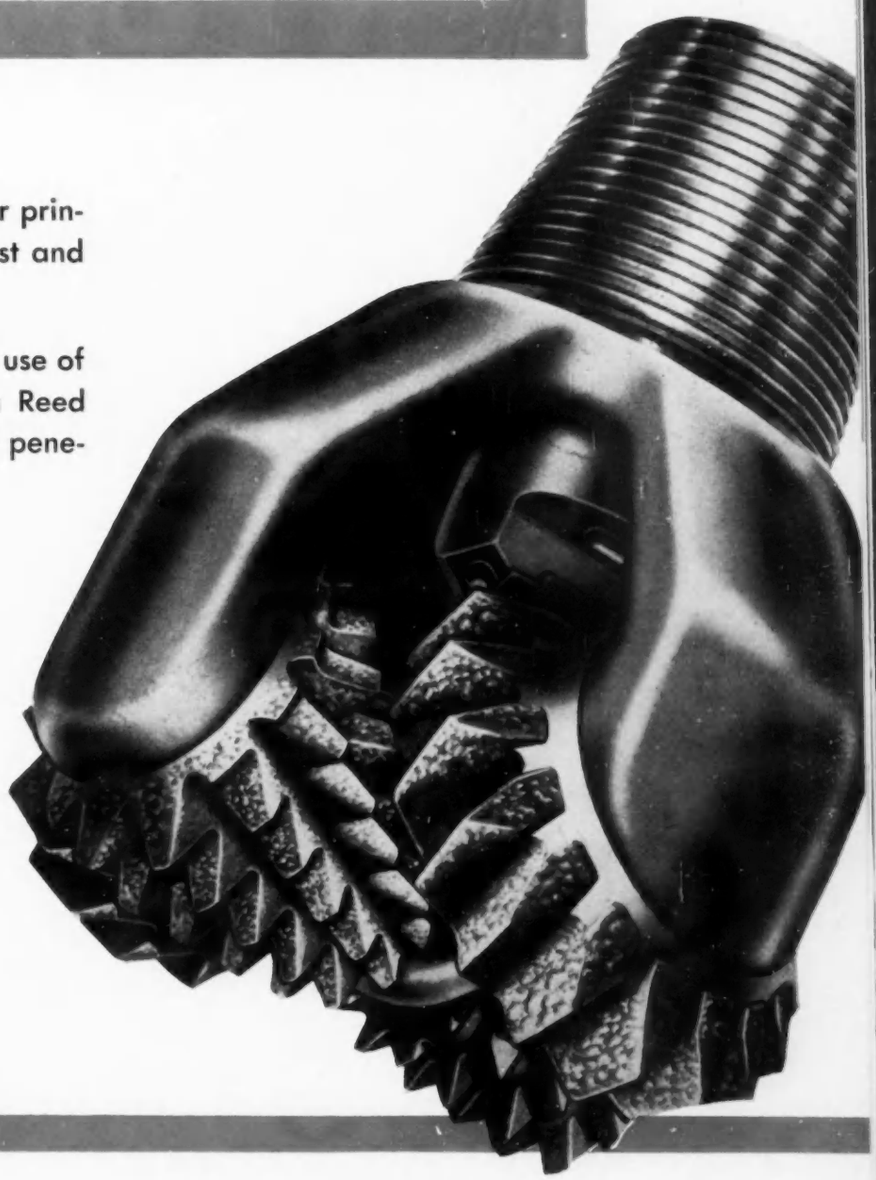

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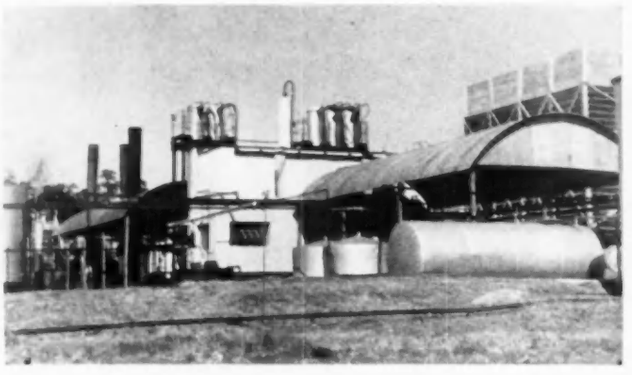
The Camiri refinery, originally built by Standard Oil Company (New Jersey), is now operated by the government's oil company.



Bolivia's principal refinery is the YPFB plant at Sanandita, not far north of the oil fields in the Salta district of Northern Argentina.

have been known for many years and are confined to a narrow belt known as the "Sub-Andean Trough." All production and seepages seem to be related to very steep folds, usually overthrust, in the "alpine foreland," or piedmont, zone. Production is from the Devonian, Gondwana (Permo-Carboniferous) and Teritary, but the Devonian is commonly considered the probable source.

Dr. John L. Rich, in his able summary of the "Oil Possibilities of South America in the Light of Regional Geology" (AAPG Bulletin, May, 1945), looks with great favor on the area east and southeast of this narrow belt, extending the prospective territory eastward almost of Corumbá on the Brazilian frontier, and southward into Paraguay well past Asuncion. He does this partly in expectation of stratigraphic traps on the eastern flank of the great geo-syncline which is the Sub-Andean Trough. Some drilling about to be launched by Union Oil Company of California in Northern Paraguay—the scene of the Gran Chaco War between Bolivia and Paraguay some years back—may soon throw some light on these prospects.

In addition to Bolivia's experiment in taking over and monopolizing its entire oil industry, there is a unique feature here—agreements with the governments of adjoining countries for joint exploration and development operations wholly in Bolivia. Bolivia's favorable oil belt is divided into three portions. The southern segment is involved in the Bolivian - Argentine "convention," an agreement which provides that Argentina shall furnish the funds for further oil exploration in that territory, and shall construct a railroad connecting Salta with Santa Cruz, Bolivia. Rails have been laid from Perico, in Jujuy, a junction on the line to La Paz, as far as Yacuiba, a station on Argentina's northern frontier, but the line has not yet been extended into Bolivia and no joint oil operations have been conducted. Argentina has been too hard pressed for supplies and equipment to maintain production in its own oil fields durnig the war to release any materials for prospecting in Bolivia.

Similarly, the central segment is covered by a Bolivian-Brazilian "convention" which provides that Brazil will extend the railroad from Corumbá, on its western frontier, to Santa Cruz, Bolivia, to connect with the line to be built north from Argentina. Brazil also is to furnish funds (reported as $2,500,000) for oil explorations in this sector, following which Bolivia engages to carry on with the expenditure of a like amount. It will be noted from the map that all of Bolivia's present producing areas, active and inactive, lie within the Argentine "zone of influence," but the Brazilian zone included Saipurú where, as stated above, a producer was completed many years ago but plugged for lack of a market. Brazil may have in mind redrilling that area, which will not be so remote from an outlet when the rail lines are built into Santa Cruz. Brazil has made more progress on the railroad construction than has Argentina, the grading having been done as far as San José and tracks laid as far as Roboré west of Corumbá. Presumably each "convention" provides that the governments concerned will receive the value in crude oil of the funds expended in Bolivia, but the precise terms of the agreement have never been made public.

Third Segment

The third segment, on the northwest, remains open. There is some thought that the Bolivian government may devise another partnership agreement, such as a joint stock company with part of the shares to be taken by the government and part by private oil interests, domestic or foreign, but nothing has been announced on it. That area is the most remote and inaccessible, and will remain so, even after completion of the new railroads.

The accompanying tables set forth the statistics on Bolivia's oil production from the beginning, and the details of its refinery operations for 1944.

Bolivia 1944 Crude Produced, Refined and Exported
(In barrels)

	Camiri	San-andita	Bermejo	Total
Total Crude Prod	94,053	102,600	117,294	313,949
Daily Avg. Crude Prod.	257	280	321	858
Total Crude Refined	91,034	101,399	.....	192,433
Daily Avg. Crude Re'd	249	277	.....	526
Crude Exported	.....	.....	86,311	86,311
Daily Avg. Crude Exp'd	.....	.....	236	236
Total Crude Consum'd	.....	.....	.....	278,744
Daily Avg. Crude Consumed	.....	.....	.....	762

Bolivia 1944 Refinery Output
(In barrels)

	Sanandita		Camiri	
PRODUCTS	Total	Daily Avge.	Total	Daily Avge.
Gasoline	38,058	104	58,705	160
Kerosene	4,816	13	9,054	25
Diesel	4,422	12	8,456	23
Fuel Oil	51,783	142	12,251	34
Erta	.....	.....	63	.....
Losses	2,300	6	2,496	7
Total	101,399	277	91,054	249

Annual Crude Oil Production of Bolivia
(Cubic Meters)

YEAR	Camiri	San-andita	Bermejo	Cama-tindi	Total
1925	.....	.....	424	.....	424
1926	.....	1,210	1,603	.....	2,813
1927	2,412	1,349	2,608	.....	6,369
1928	858	.....	1,763	.....	2,621
1929	942	2,690	4,386	723	8,741
1930	4,387	891	2,616	1,165	9,059
1931	777	1,382	.....	.....	2,159
1932	1,009	8,658	.....	.....	6,667
1933	8,179	9,635	.....	.....	17,814
1934	12,131	12,985	.....	.....	25,116
1935	14,395	11,584	.....	.....	25,979
1936	7,457	9,239	.....	.....	16,696
1937	12,754	7,502	.....	.....	20,256
1938	14,377	7,221	.....	.....	21,601
1939	17,328	16,545	.....	.....	33,873
1940	17,765	28,144	.....	.....	45,909
1941	16,678	20,636	.....	.....	37,314
1942	19,195	22,165	7,560	.....	48,920
1943	17,443	17,448	18,173	.....	53,064
1944	14,953	16,312	18,648	.....	49,913
Cumulative to end '44	183,040	192,599	57,786	1,888	435,313
9 Mos. 1945	13,581	12,246	18,739	.....	35,566
Est. All 1945	20,580	16,245	27,740	.....	64,365

Note: Cubic Meter equals 6.29 barrels.

Faster, Cheaper Air Travel Promised

By WELDON B. HILL, Staff Writer

Commercial Lines Plan New Over-Ocean Routes

There are accommodations for 80 passengers in the 65-ton Boeing Stratocruiser-type Clipper which Pan American World Airways has ordered. These "big brothers" of the famous B-29 Superfortresses, one of which is shown above have a cruising speed of 340 miles per hour and will be able to fly to London in 11½ hours and provide eight-hour and 33-minute service coast-to-coast.

COMMERCIAL air lines, with eyes on increased world-wide travel by personnel of United States oil companies, are fashioning new over-ocean air routes calling for shorter travel time and reduced fares.

Plans for new international air routes have been announced by Pan American World Airways, Transcontinental & Western Air, Inc., Braniff Airways, and others.

Plans for new over-ocean air flights apparently are making Houston the gateway to Central and South American oil areas, while New York and San Francisco continue to be the jumping-off places to European, Near Eastern and Far Eastern oil fields.

Pan American has announced plans for a new air route between Houston and Barranquilla, Colombia, via Merida, Mexico. Flight time for this new schedule will be reduced from the present 33 hours, 50 minutes, to 6 hours, 59 minutes, with the fare reduced from $207.10 to $95.50.

Braniff Airways also has plans for direct air routes between Houston and South American points. These plans would give Houston direct connections with Colombia, Venezuela, Brazil and Argentina by way of Merida and the Panama Canal Zone.

At the Canal Zone Braniff's routes would divide, with one leg going to the northern coast of South America, including Cuba, and return to Houston. The other leg would proceed south from Panama to Rio de Janeiro and Buenos Aires.

Hearings on the proposed new Houston-South American routes of Pan American and Braniff have been held by CAB with final decision expected soon.

Pan American's proposed Houston-Barranquilla route would link the operating headquarters of major petroleum producing and processing companies and a large concentration of oil field supplies manufacturers with the largest center of petroleum production in South America.

As a very large portion of the traffic between Houston and Barranquilla would consist of business personnel in the oil industry whose destination would be Venezuela or the Netherlands West Indies, Pan American has coordinated the route with schedules on connecting lines in its Latin American pattern of service. At Merida, a feeder line would run into Guatemala while other Mexican cities could be reached by connections with Mexico's CMA, a Pan American national affiliate. Access to interior points in Colombia will be available via Colombia's national airline AVIANCA, also a PAA affiliate.

It is expected that an average of 87 round trip passengers per day would be accommodated between the United States and Colombia as compared with about five per day in 1941. This increase will be due in part to extended oil operations in South America which have been boosted by recent discoveries.

Pan American has advised that it has been the company's experience in the past that even for those oil companies which have their principal headquarters in New York, the majority of the personnel traveling to South America originate or travel through the Houston area. Movements of mail and express between the Houston area and South America have the same characteristics of passenger travel.

The new Houston-Barranquilla route is 731 miles shorter than the present route through Mexico and 433 miles shorter than the route through Miami. Giant land-type Clippers capable of winging through the substratosphere at more than 300 miles per hour will bring fares and cargo rates within the reach of the average man.

The new aircraft will increase the Clippers' cargo capacity 17 times the 1941 figure of 1,700,000 pounds, the last pre-war year.

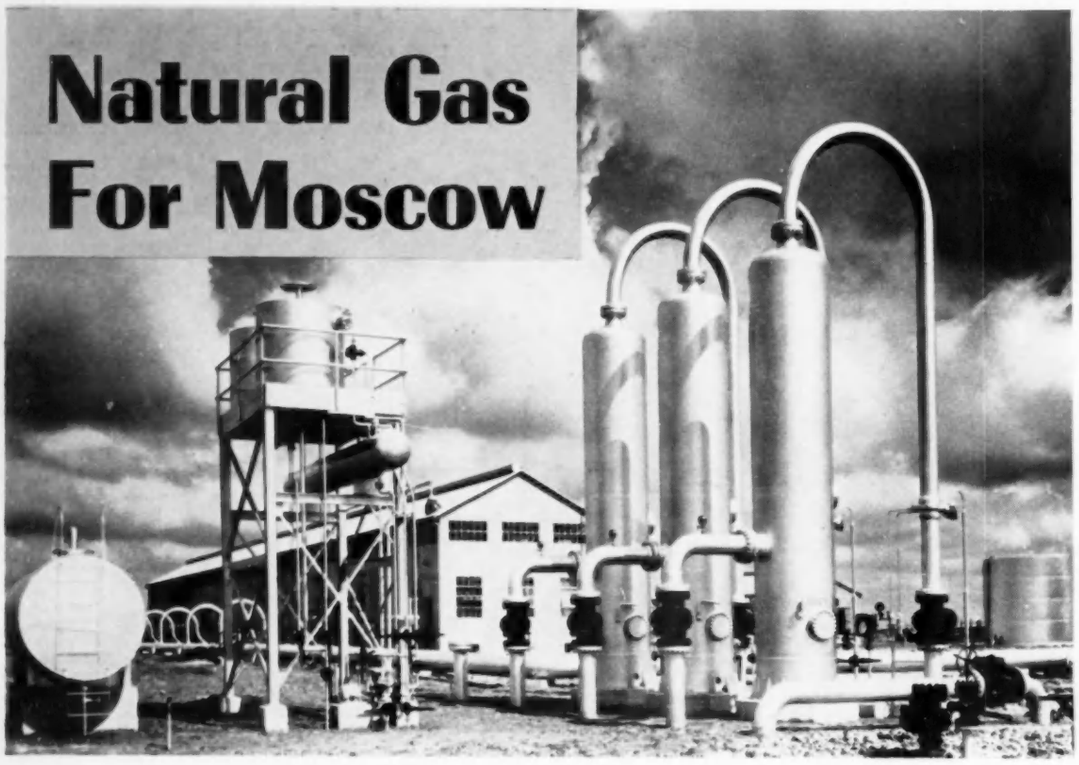
The latest of Pan American's acquisitions are Boeing double-decked, four-engined Stratocruisers, commercial air transport developments of B-29 Superfortresses. These planes will be the first postwar airliners to embody full advantages of wartime aeronautical developments.

An international division has been set up by Transcontinental & Western Air, Inc., to have charge of the operation of the company's new over-ocean service. A fleet of "Constellations," which fly 300 miles an hour, will be put into service with the new fast planes cutting from 9½ to 11½ hours off present commercial transatlantic schedules to Europe. Reduced travel time means reduced fares.

TWA will serve the Persian Gulf oil area with a flight from New York to Bahrein requiring 38 hours, 40 minutes.

The oil man who is required to make a hurried business trip to any of the world's oil fields will find the new air routes his answer to speedy travel.

Natural Gas For Moscow



Oil-wash dust scrubber installation on Moscow-Saratov pipe line. This plant, built in the Southwestern United States, typifies exactly one of those designed for the 450-mile Moscow-Saratov pipe line now being built in Russia.

NATURAL gas soon will be available in Moscow with the aid of American equipment on the 450-mile pipe line that will supply gas from the Saratov area on the Volga river.

Four plants to be installed on the pipe line are being shipped from the United States to the Soviet Union. All the drawings and specifications were prepared in the engineering department of the Stearns-Roger Manufacturing Company, Denver, and all the special equipment for treating the gas is being fabricated in the company's Denver shops.

Installations include dehydration and desulphurizing plants, a special oil-wash dust scrubber installation and gas odorization plants. The pipe line will be 12¾ inches in diameter, with normal full load rating of 60 million standard cubic feet of gas per 24 hours (66,000 cubic meters per hour) at operating pressures of 735 to 850 pounds per square inch (average of 55 atmospheres). All processing equipment is designed for 850 pounds operating pressure and sized to handle excess load of 25 percent.

Metric System Followed

Because the metric system is used in Russia, as in most European countries, the equipment follows specifications and drawings prepared in the metric system as well as in the usual English foot-pound-second system of measures.

The combination dehydration and desulphurization plants will remove all water from the gas and check corrosion by eliminating sulphur from the gas. Special attention was given to these units because of the danger of freezing in the pipe lines during the long Russian winters when temperatures of 50 degrees below zero must be met.

All suspended solid matter in the gas will be removed by the dust scrubber plant. The gas is literally washed with oil in specially designed scrubbing equipment, the oil picking up the solid particles suspended in the gas stream and permitting only clean, dry gas to enter the pipe line.

Gas Odorized

To offset the characteristic lack of odor in natural gas, odorizing units are installed to give the gas a distinct and characteristic odor so that any leaks in the entire system may be detected readily, whether the leak occurs in the pipe line, distribution system or in utilization appliances.

A supply of necessary chemicals and spare parts is included in the shipments.

During the war years the activities of the German air force disrupted the handling and shipping of the supplies of regular types of fuel on which Moscow depended. The suffering and discomfort that resulted during the bitterly-cold winters led to designation of the Saratov pipe line as one of the first postwar projects to be undertaken.

Negotiations for the purchase of the plants in the United States were handled by the official USSR purchasing commission at the commission's offices in Washington, in Stearns-Roger's Houston offices, and at the company's headquarters in Denver.

During the progress of the work representatives of the Russian government made several visits to the engineering offices and factory in Denver. Several delegations of engineering specialists were sent from Russia to inspect the work and to become familiar with the plant designs and the various types of equipment and materials. Several of these men had not been in the United States before and were accompanied by interpreters. Others had been in the United States for periods up to two years. Exchanges of information during the progress of the work were handled by air mail and cable between Denver and Moscow.

One task of the American engineers was to supply complete instructions for transmission to Moscow, where they were translated into Russian. Two translations into Russian are made, one in technical style for use by engineers, and later in popular and easy-to-understand language that will give the Russion workers on the pipe line system an understanding of the equipment and its operation. Special classes will be set up to train the workers so they will be familiar with the new plants and their operation by the time the installation is completed.

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Personal Notes from Europe

By DR. J. BRIAN EBY

Victor Barry, petroleum attache with the American Embassy at London throughout the war, is resigning to return with Socony-Vacuum Oil Company in New York.

* * *

The Rt. Hon. E. Shinwell is Minister of Fuel and Power in England's labor cabinet. The Petroleum Division is headed by Sir Norman Duke, with K. L. Stock, assistant secretary, and G. W. Lepper, technical adviser.

* * *

A. R. M. Murray is the representative of the Ministry of Fuel and Power on the important British Intelligence Objectives Sub-Committee which represents all British ministries, and inquiries concerning British oil policies or data should be addressed to him. The offices of the Ministry is at No. 7 Millbank, London, England.

* * *

Neil Borum, head of the transportation department of the American Embassy in London, is doing wonders with one of the most vexing jobs in the city, getting American civilians here, there and home.

* * *

Philip Clover heads the American oil section of the military government of Germany, and is stationed at Berlin. First Lt. George L. J. Dalferes, administrative officer and assistant, Wolfgang Greeven, deputy chief, and Capt. Charles M. D. Peters, executive assistant, along with Mr. Clover, may be addressed in care of the Oil Section Industry Branch, Economics Divisions, OMGUS, APO 742, c/o Postmaster, New York, N. Y.

* * *

L. W. Harford, Clover's British counterpart, represents Great Britain on the Allied Control Council. Colonel Pierre Minard is French representative, and A. K. Simakof is Russian representative.

* * *

Gen. Walter B. Pyron, retired from the Army, vice president of Gulf Oil Corporation, vice president of Danish-American Prospecting Company, and director representing Gulf's interest in the Kuwait Oil Company, is planning to locate in London.

* * *

The Royal Dutch Shell office buildings in The Hague, Carel Van Bylandtlaan 30, are undamaged but still occupied partly by Dutch military and partly by Shell employes who stuck out the entire German occupation. H. G. A. Quarles van Ufford is executive representing the London directors, and M. K. H. Bauermann is acting chief geologist. A. A. G. Schiefferdecker is head of production in eastern Holland, and E. L. S. Siccama acting chief of production. J. H. M. A. Thomeer, formerly with Shell in the United States, is geophysicist and geologist, and J. F. Browne, production engineer at The Hague. During the occupation, the Germans more or less kept hands off but planned to transfer the entire organization to the Russian oilfields if and when they had been captured. The greatest task the Shell carried out under the Germans was doing exactly nothing. The London Shell scientific staff under Dr. Leyds plans to move to The Hague about May, 1946.

* * *

O. Heerman, former chief geologist of North European Oil Company, is reported to have been killed in Russia while inspecting oil installations for the Germans.

* * *

The Anglo-American (Standard Oil Company of U. G.) is located at Brettenham House, Lancaster Place, London W. C. 2, England. David A. Shepard is chairman of the board and Brian Mead represents refining operations. R. P. Bolton is in charge of production exploration in Europe. Carroll Cook, geologist, is now on the European continent. The company operates the Agwi refinery at Fawley, near South Hampden, using Venezuelan crude.

* * *

The German Seismos Company, well known to all American oil companies, continues its organization at Celle, near Hannover, Germany, with Dr. I. Schander as director. Dr. L. Mintrop is reported to have retired to Münster in Westphalia. Dr. Frederich Trappe, seismologist with many years in the United States (Texas and Louisiana) is reported to have been killed with his wife and children in the bombing of Berlin.

* * *

Dr. J. Mekel, professor of geology at Delft University, Holland, and former chief geologist of Shell, was executed by the Germans in The Hague, June, 1941, having been accused of underground activity. Mekel was a gifted scientist, well known in the United States, and his death is a real loss. His last letter to his wife is a classic example of the fortitude, courage, and indomitable spirit the Dutch displayed so often during the war.

* * *

Walter Kauenhoven, geologist of Socony-Vacuum in Hamburg before the war, is reported to have been killed in Poland while examining oil properties for the Germans.

* * *

F. Holweck, inventor of the Holweck pendelum and professor at Curie Institute in Paris, is said to have been tortured to death in 1941 for refusing to divulge secret machine inventions to the Nazis.

* * *

L. Engberts and I. M. J. Valeton, Shell geologists in the Dutch East Indies, died in Jap prison camps during the war. W. Oosten, Shell manager in the East Indies, returned recently after three years' imprisonment in Japanese camps.

* * *

The Anglo-Iranian Oil Company offices in Britannic House, Finsbury Circus, London E. C. 2, looks out over the worst ruins in the center of the city of London. C. A. P. Southwell, geologist, did his part as roof warden and fire watcher in sweeping incendaries off the roof of Britannic House throughout the blitz. While helping to save his office he lost all his personal property in the same days.

Since the abandonment of unit control in Europe, namely Supreme Headquarters European Allied Forces (SHEAF) in July, 1945, the mapping of oil fields and the inventory of oil properties have been taken over by the various governments in their respective zones of occupation. The British at this time have geologists and surveyors mapping the North German oil fields, which lie in the British zone. By agreement this data will be shared by the other occupying governments but the actual release of such data must first be granted by the government responsible for the same.

The OIL WEEKLY
Monthly International Section

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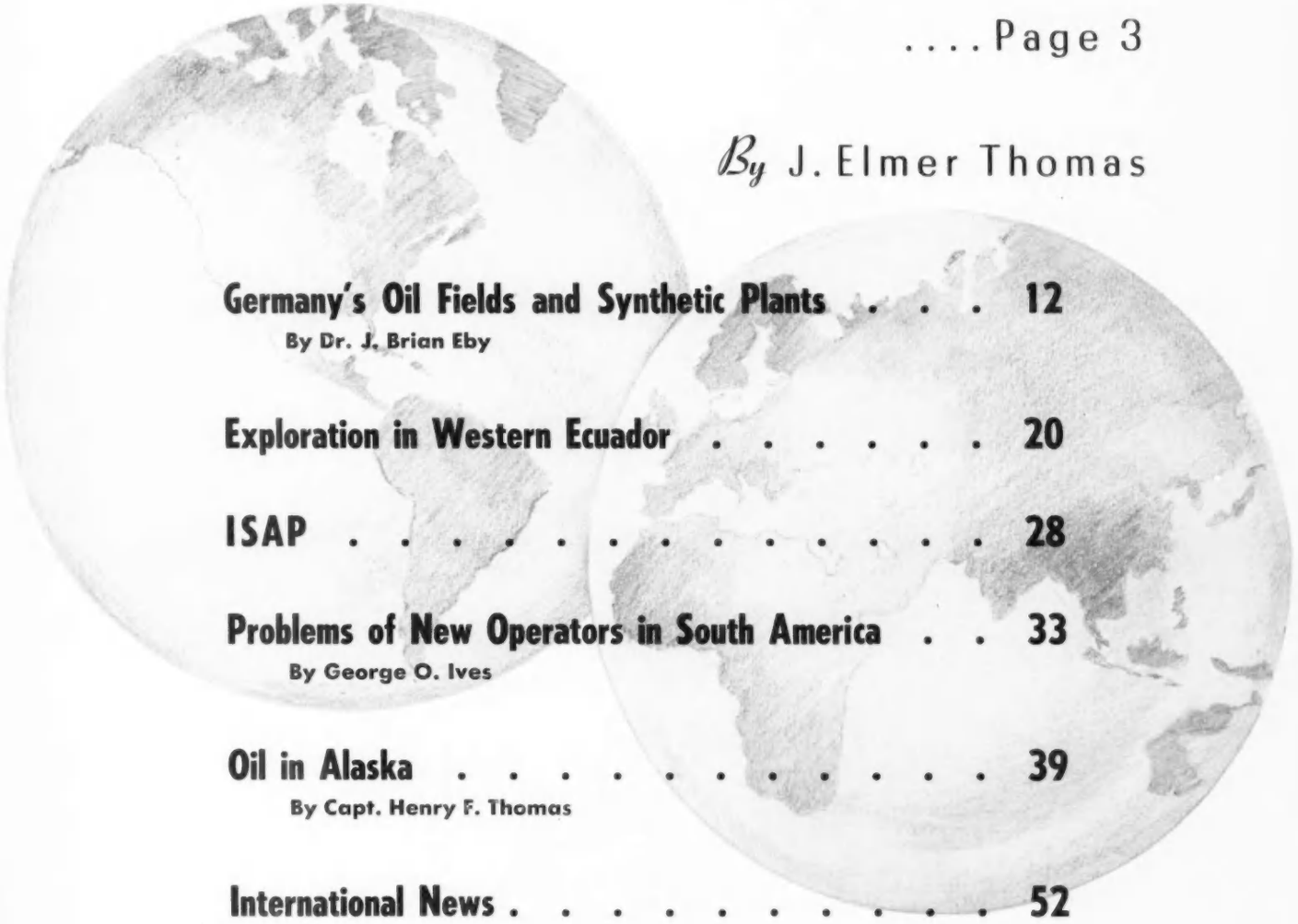

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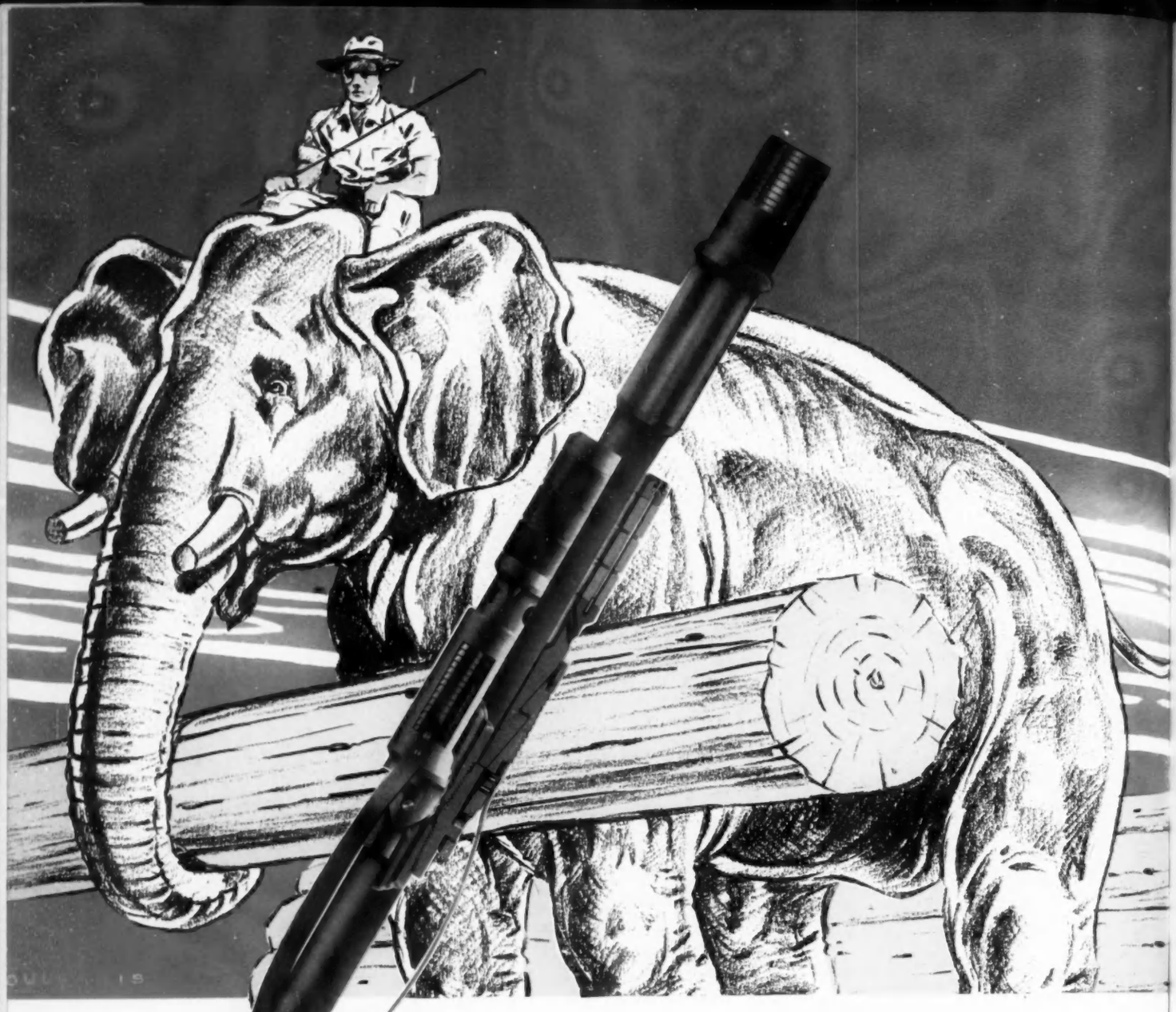

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Argentina's Oil Industry During the War Years

Figures on Argentina's war-time production are a tribute to the care and ingenuity of the nation's oil industry

By J. ELMER THOMAS
Consulting Geologist, Fort Worth

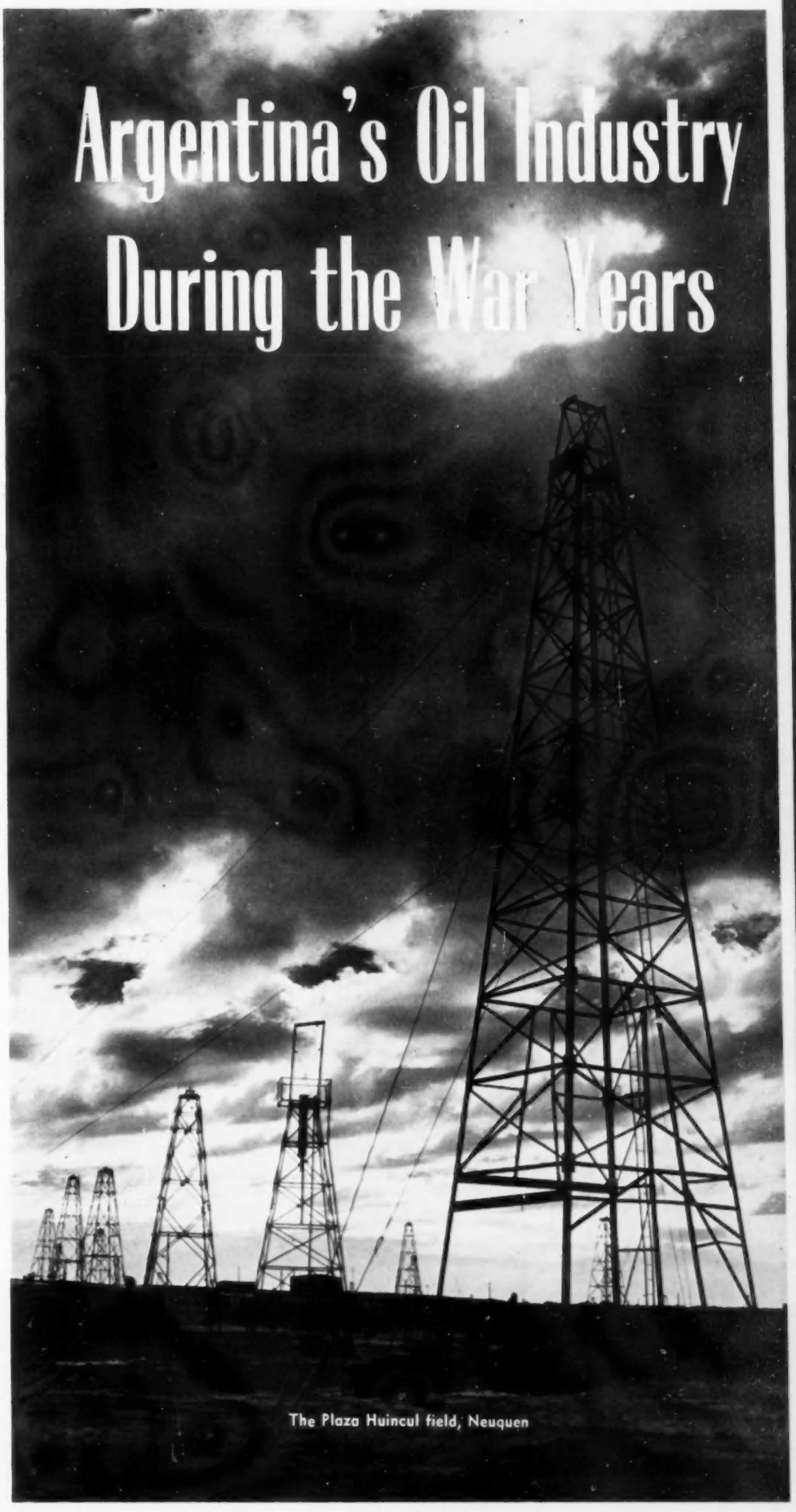
THE oil industry in Argentina faced the same problems of equipment shortages that confronted most other nations during the war. Lack of sufficient wire line, casing, hard surface materials and other supplies caused a drastic reduction in drilling activity. Consequently, crude production also declined, but not nearly to the extent that drilling fell off. With a domestic production of approximately ⅔ its local consumption, citizens of Argentina were far better off than many others.

The drastic reduction in drilling activity is shown graphically in Figure 1. It will be noted that total completions per year fell from a peak of 372 in 1941 steadily downward until only 155 tests were completed in 1945.

All wells had to be selected largely upon the basis of where the most oil could be obtained with the least critical materials. Hence, the drilling of wildcat wells showed the earliest reduction. Even "cannibalism" was resorted to, and dozens of old wells were abandoned to use the casing thus made available in new wells which would afford larger yields.

How well the country's output of crude was maintained under these conditions is shown in Figures 2 and 3. The annual production of Argentina, shown in Figure 2, continued to follow its previous steady climb through 1941, 1942 and 1943 but decreased during 1944 and 1945. The decline in annual production rates, as will be noted in Table 1 has not been great enough to reduce output below the 1941 level. Production in 1941 totaled 3,499,757 cubic meters (22 million barrels), then rose to 3,949,412 cubic meters (24,835,500 barrels) in 1943. From this level, Argentina's production declined to 3,634,494 cubic meters (22,860,000 barrels) in 1945. Although total wells drilled in 1945 was down 58 percent from the peak of 1941, total production for 1945 was still 10 percent larger than that of 1941, and only down 8 percent from the peak of 1943.

However, the drop in daily average production per month, as shown in Figure 4, fell 15 percent from the peak in December, 1943, to July, 1945, since



The Plaza Huincul field, Neuquen

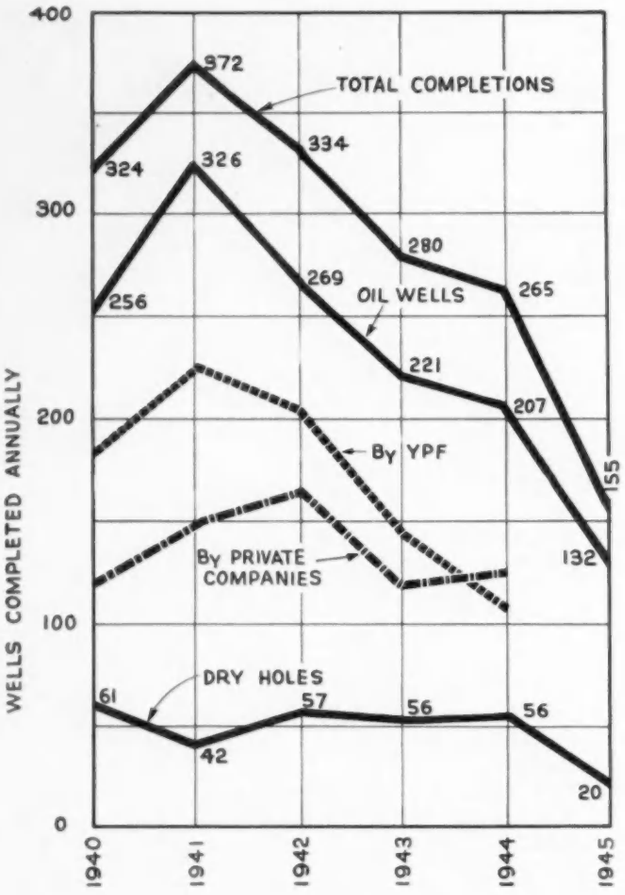


FIGURE 1
Drilling activity during the war years.

then production has increased slightly. From a peak of slightly more than 70,000 barrels daily in December, 1943, production dropped steadily to 60,000 barrels in July, 1945, before being checked.

This is a remarkable showing, and is a tribute to the care and ingenuity exercised by all producing companies operating in Argentina. In addition to the general management, the men on the firing line responsible for it deserve much credit. The latter include:

Company	Field Manager	Drlg. Supt.
Comodoro Rivadavia:		
YPF (Gov't.)	Emilio Montané	Adolfo Pacagnini
Diadema (Shell)	E. J. Douze	H. Houtman
Plaza Huincul:		
YPF	Bernardo L. Astiz	Marcos Seifer
Standard (N.J.)	John Lavenas	Ray Alling
Mendoza:		
YPF	José M. Messone	Teodoro Platz
Salta:		
YPF	Francisco Herpig	Hector Gonzalez
Standard (N.J.)	Oscar Serrat	Ike Timberlake

Relative Production

Figure 2 and Table 1 also show the relative volume of the government's production and that of the private companies. Since 1933 the production of Yacimientos Petroliferos Fiscales (Government Oil Fields) has exceeded that of the private companies, and in recent years has been twice the volume produced by private companies.

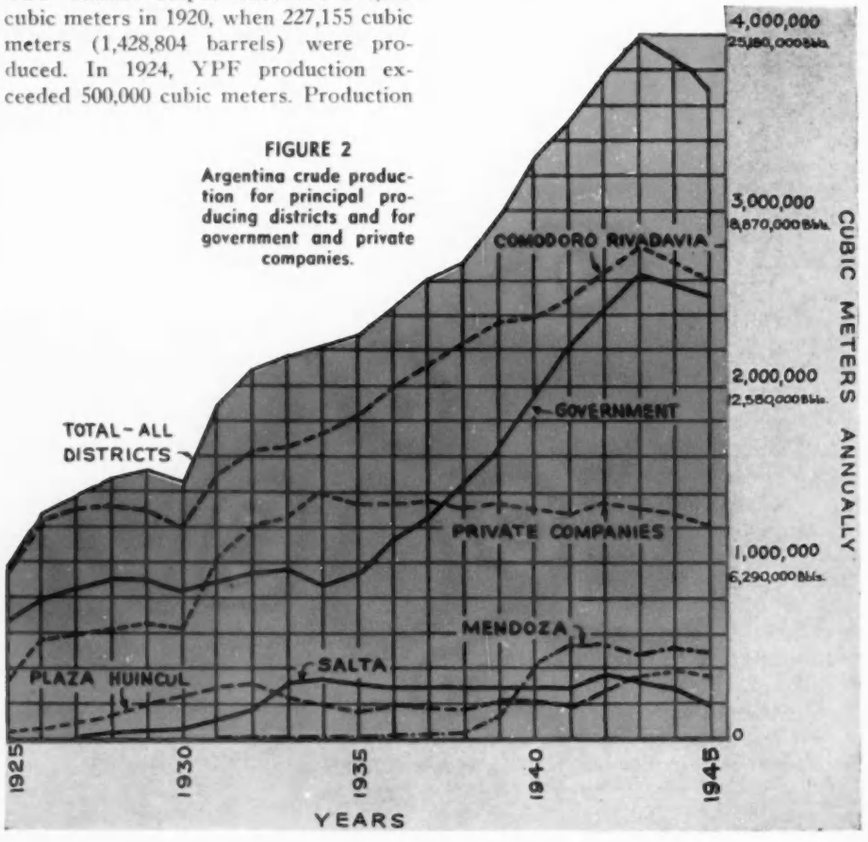
Starting in 1907, the production of YPF showed a gradual increase until 1920, after which a more rapid rise occurred with only temporary setbacks. YPF annual output exceeded 200,000 cubic meters in 1920, when 227,155 cubic meters (1,428,804 barrels) were produced. In 1924, YPF production exceeded 500,000 cubic meters. Production in that year was 553,921 cubic meters (3,484,163 barrels). The real advance in YPF production began in 1935. From slightly less than 1 million cubic meters (6 million barrels) in 1935, YPF production rose to a peak of 2,632,901 cubic meters (16,560,947 barrels) in 1943. A slight decline in the past two years brought output down to 2,454,558 cubic meters (15,439,170 barrels) in 1945. The decrease of the last two years was due solely to a shortage of materials. When new and additional equipment becomes available, further rises may be expected.

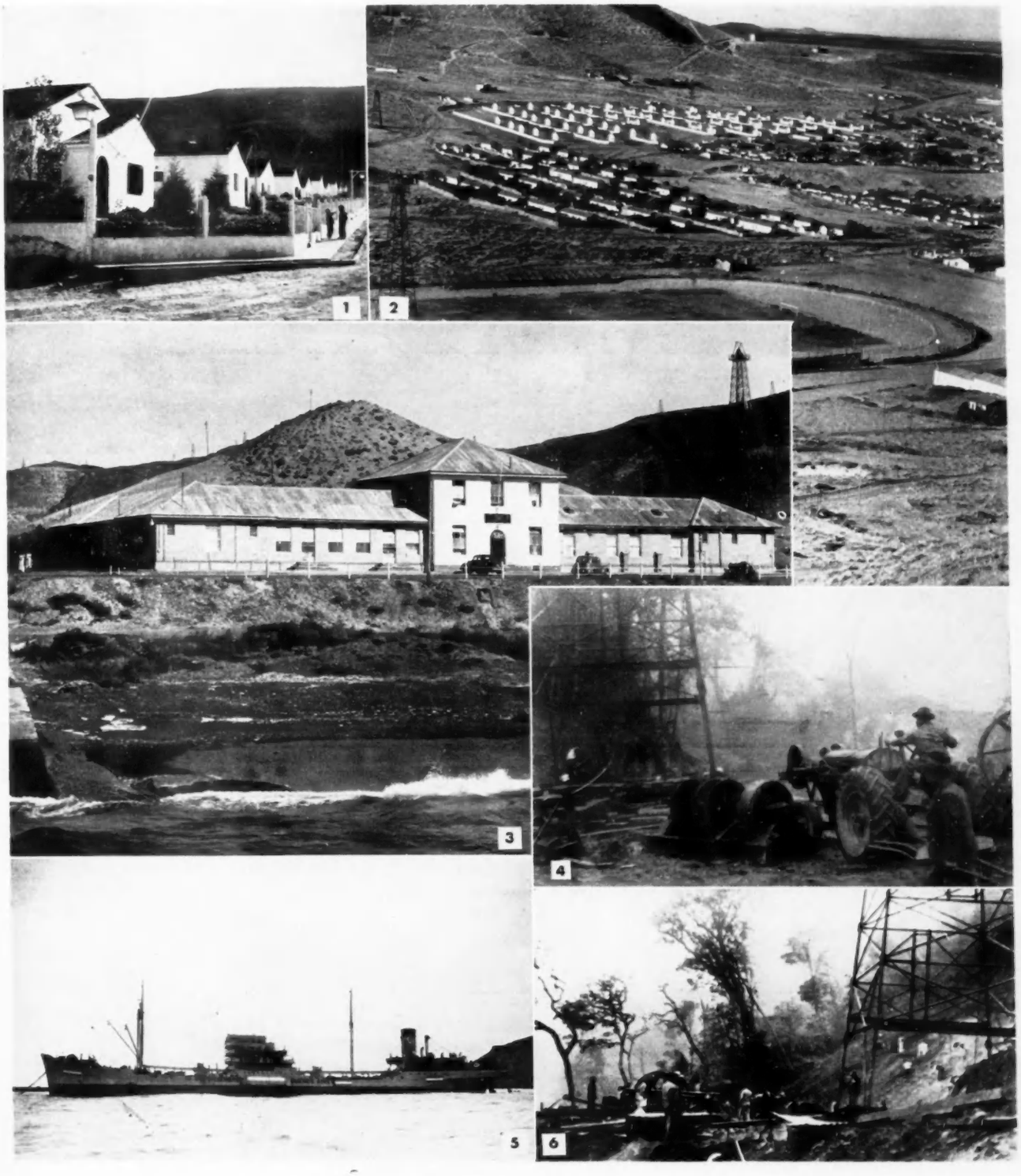
Private companies did not produce any oil in Argentina until 1916, but from 1931 to 1938 produced more than the government. Since 1934 the production of the private companies has declined gradually but steadily from a peak of 1,394,150 cubic meters (8,769,203 barrels) to 1,179,936 cubic meters 67,421,-797 barrels) in 1945.

The private companies operating in Argentina include Diadema (Shell) at Comodoro Rivadavia; Ferrocarrilera (Railways) at Comodoro Rivadavia; Astra (an Argentine company) at Comodoro Rivadavia; Standard (N. J.) at Salta and Plaza Huincul; and Rio Atuel, a local company with small production at Sosneada, south of the principal Mendoza fields.

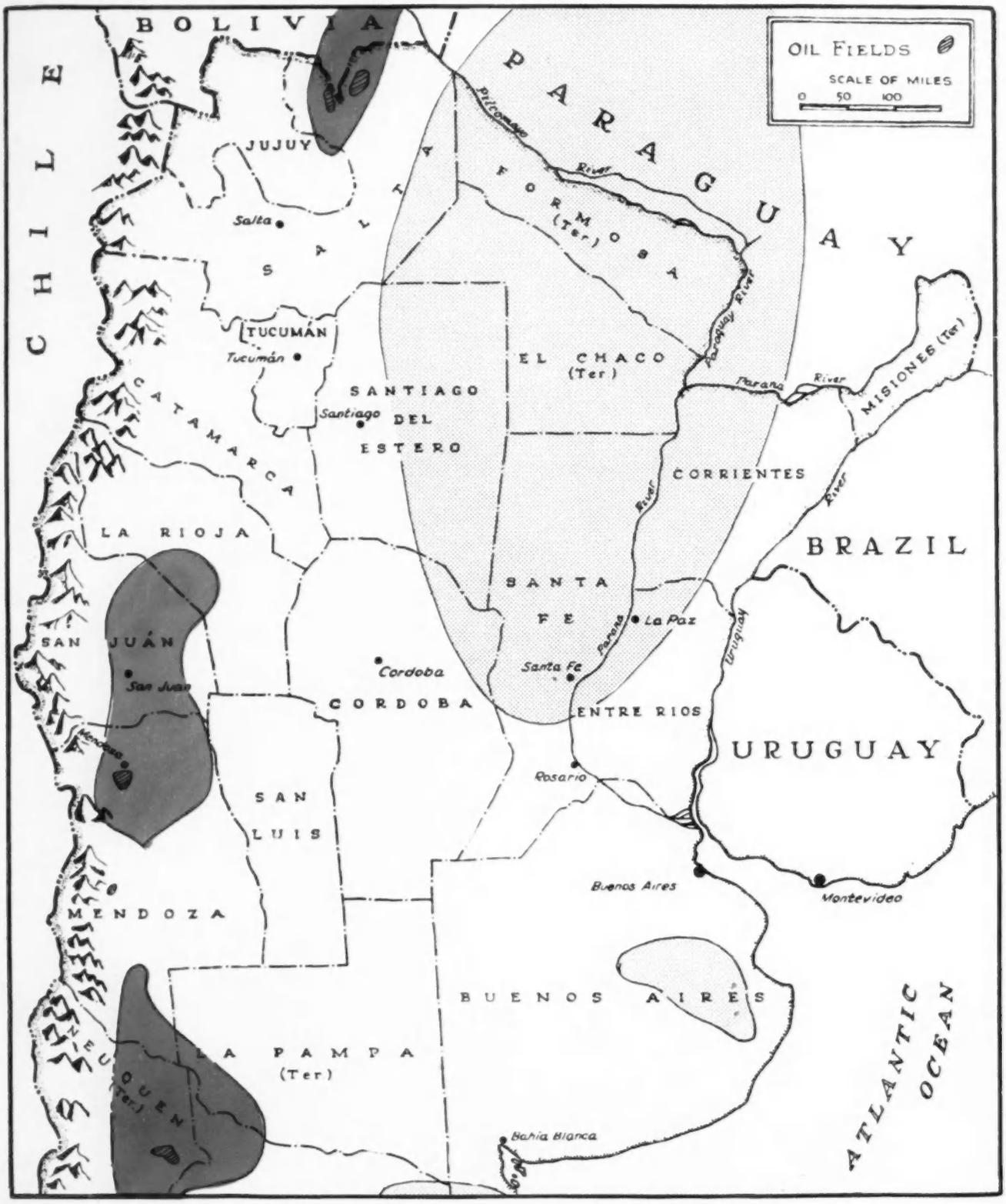
Private companies made little progress until 1924, and in that year, coincidentally, the Mining Bureau decided to enforce a law passed in 1919, which restricted the lands available for grants

FIGURE 2
Argentina crude production for principal producing districts and for government and private companies.



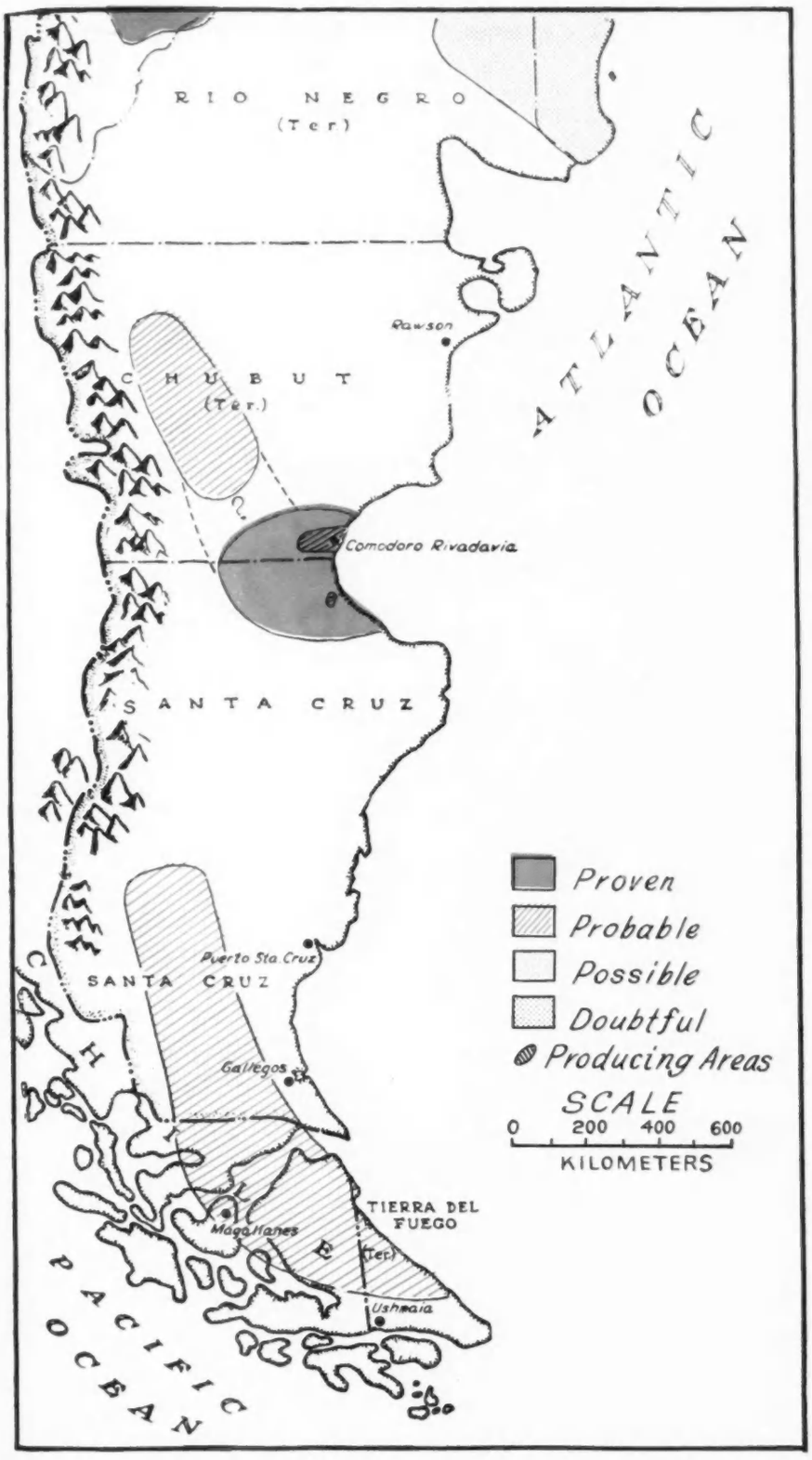


1. New residential district of laborers' homes at Comodoro Rivadavia.
2. YPF Company camp and athletic field, Comodoro Rivadavia.
3. Hospital for YPF employes, Comodoro Rivadavia.
4. Rigging up a drilling well in the San Pedro field, Salta.
5. The YPF tanker "13th of December." The Comodoro Rivadavia field was discovered December 13, 1907, and it is an annual company holiday.
6. Rigging up a well for a cable tool test, San Pedro field, Salta.



to private companies. The federal provinces were first withdrawn, to create a national reserve, and this was followed subsequently by most of the states. On April 2, 1935, the first organic oil law was revised and amplified, with changes made in the royalties and taxes. These latter, it is interesting to note, are on a sliding scale predicated upon the depth of the wells, distance from the coast and quality of the oil.

The general effect of these restrictive laws was to confine the private companies to lands under lease in 1924. Nevertheless, their production increased at a more rapid rate than the government's. In 1931 YPF was passed in total annual production and did not regain the lead until 1938. For the last ten years the private companies have maintained a fairly steady position, Diadema (Shell) with about 12,000 barrels per day and Ferrocarrilera with 3600, in both cases confined to Comodoro Rivadavia, and Standard with about 3000 barrels per day, ⅓ at Plaza Huincul and ⅔ at Salta, where produc-



Principal sedimentary basins in Argentina and their petroleum possibilities.

tion recently has shown a considerable decline.

Argentina has been an oil producer for nearly 40 years, ever since the government sent a drilling crew to develop water wells in an arid district in Southeast Chubut, on the shores of San Jorge Gulf. They struck oil December 13, 1907, bringing in the Comodoro Rivadavia Field. Since that time December 13 has been an official holiday for all employes of YPF.

Comodoro Rivadavia is Argentina's most important producing area. Until after 1925, it furnished practically all the country's production, and even today it furnishes about ⅔ of the country's crude output. Comodoro Rivadavia's relative importance with the other three principal producing areas of Argentina is shown in Figure 2, which gives the annual production for each district. The figures for 1945 are in part estimates, but are very close. In all cases final figures were obtained up to November, and in some cases into December.

The Comodoro Rivadavia, or Chubut, district contains at least 14 separate producing areas. It is the southern-most production in South America, being located on the north flank of the San Jorge sedimentary basin. Production of the area has been maintained throughout the years by discovery of additional producing structures, and as yet there are no signs to indicate this trend will not continue in the future.

An important strike was made on June 26, 1944, on the south flank of the San Jorge basin, near the town of Caleta Olivia in the Province of Santa Cruz, 50 miles south of Comodoro Rivadavia. This discovery indicates the Comodoro Rivadavia area may be expected to spread and presages the possibility of the region producing even larger volumes than in the past.

The Caleta Olivia discovery well, 0-12, had an initial production of 1000 barrels daily at 5381 feet from 10 feet of pay. This was the lowest of ten saturated beds. There also were good oil showings found in four sands between 4085 and 4174 feet. The oil is of asphalt base, with no paraffin, and the gravity, 0.873, is better than anything developed at Comodoro Rivadavia.

Three additional oil wells have been completed there, and on, the 0-20, good for 125 barrels per day, is four miles southwest of the discovery and may be on a separate anticline. The structure in this district was worked out by core drilling 20 years ago, the holes having been taken to depths of 2500 to 4000 feet. Gently folded anticlines are much interrupted by faults, which seem to control the accumulation. The strike is of great significance, since the new pay was stratigraphically lower than any horizon then being produced at Comodoro Rivadavia. The strike will not only lead to increased activity in that district but will cause a review of much earlier geophysical work which was not studied for horizons at that depth.

Other Producing Areas

The other producing areas of Argentina consist of Mendoza, Salta and

Standard's four-inch pipe line from the Agua Blanca field, Salta, to the Manuel Elordi refinery. The line also extends east to Hickman, where it joins the gathering line from Lomitos, San Pedro, Ramos and Tartagal. From Hickman, crude is shipped by rail to Formosa on the Paraguay River and thence by boat to the Buenos Aires refineries.

TABLE 1
Annual Crude Production of Argentine

Year	Government (Y.P.F.)		Private Companies		National Total	
	Cu. Meters	Barrels	Cu. Meters	Barrels	Cu. Meters	Barrels
1941	2,226,800	14,006,571	1,272,957	8,006,900	3,499,757	22,013,471
1942	2,445,586	15,382,736	1,322,961	8,321,424	3,768,547	23,704,160
1943	2,632,901	16,560,947	1,315,511	8,274,564	3,948,412	24,835,511
1944	2,576,369	16,205,361	1,275,719	8,024,272	3,852,088	24,229,633
1945	2,454,558	15,439,170	1,179,936	7,421,797	3,634,494	22,860,967

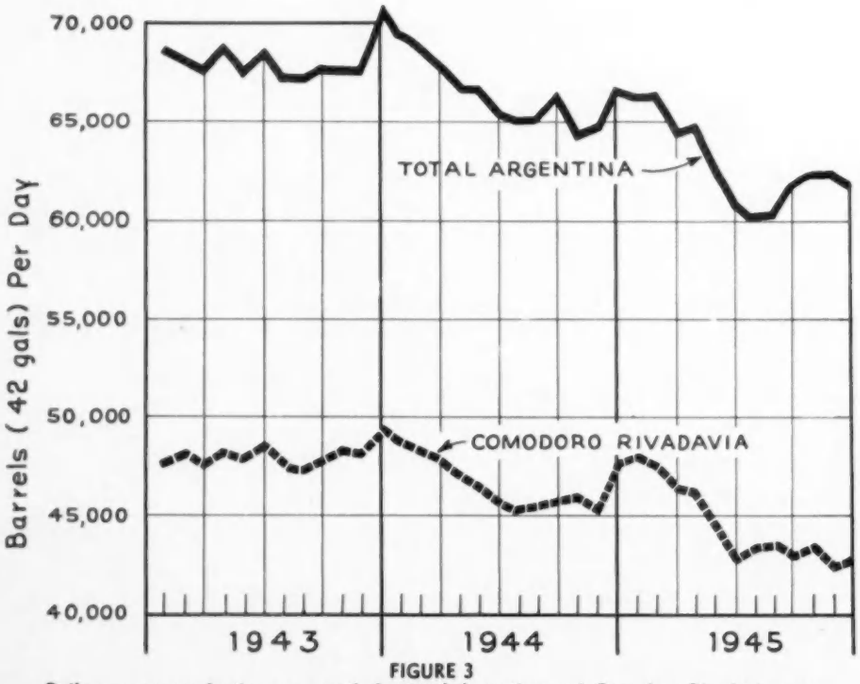


FIGURE 3
Daily average production per month for total Argentina and Comodoro Rivadavia area

Plaza Huincul. All have a number of producing fields. Mendoza, newest of the territories, discovered in 1926, is the second largest producer. Mendoza showed a rapid rise from 1938 to 1941, since when it has held its own at approximately 500,000 cubic meters (or 3,100,000 barrels) annually. Drilling depths are greatest there and the shortage of rigs and equipment has delayed more aggressive development. It has large possibilities, however, and in October YPF completed its B-16 in the Barrancas field for 2500 barrels daily.

Challaco in the Plaza Huincul district of Neuquen is another of the newer and more promising fields. It now has 63 producing wells and is only about ⅓ drilled up. The map shows the location of different producing regions in Argentina.

It is somewhat difficult to segregate true wildcats from stepout, or extension, wells in Argentina because the published statistics classify both as exploratory wells. The restricted leaseholds of the private companies, however, leave little opportunity for wildcatting by them. Standard has drilled a few in recent years at Salta, but Diadema and Ferrocarrilera have room for none at Comodoro Rivadavia. During the last quarter of 1945 Standard drilled only three wells, one dry hole at Salta and one producer and one dry hole at Plaza Huincul. Shell keeps three rigs running at Comodoro Rivadavia, two on new exploitation wells and one on reconditioning jobs.

On the other hand, YPF is an active prospector, although the number of wildcat wells drilled in the last two years was curtailed because of the supply and equipment situation. In addition to "structure tests," YPF in 1945 completed 11 tests properly classified as wildcats, compared with former numbers of 30 to 40 annually. Of these, 5 were in the Chubut-Santa Cruz (Comodoro Rivadavia-Caleta Olivia) district, 3 at Plaza Huincul and 1 each at Mendoza, Salta and Santa Fé. At the year end 9 active wildcats were drilling, 2 each at Chubut-Santa Cruz, Plaza Huincul-Rio Negro, Mendoza and Salta, and 1 in the Province of Buenos Aires.

Private Company Holdings

Of a total area of 281,802,842 acres, 247,165,380 have been reserved for the government and hence are available only to YPF. Private companies have 116,260 acres under lease. The remainder, 34,521,200 acres, is "open," although there are great difficulties confronting private companies in obtaining leases on it.

With virtually all the country to select leases from, geological and geophysical work has not been curtailed by YPF

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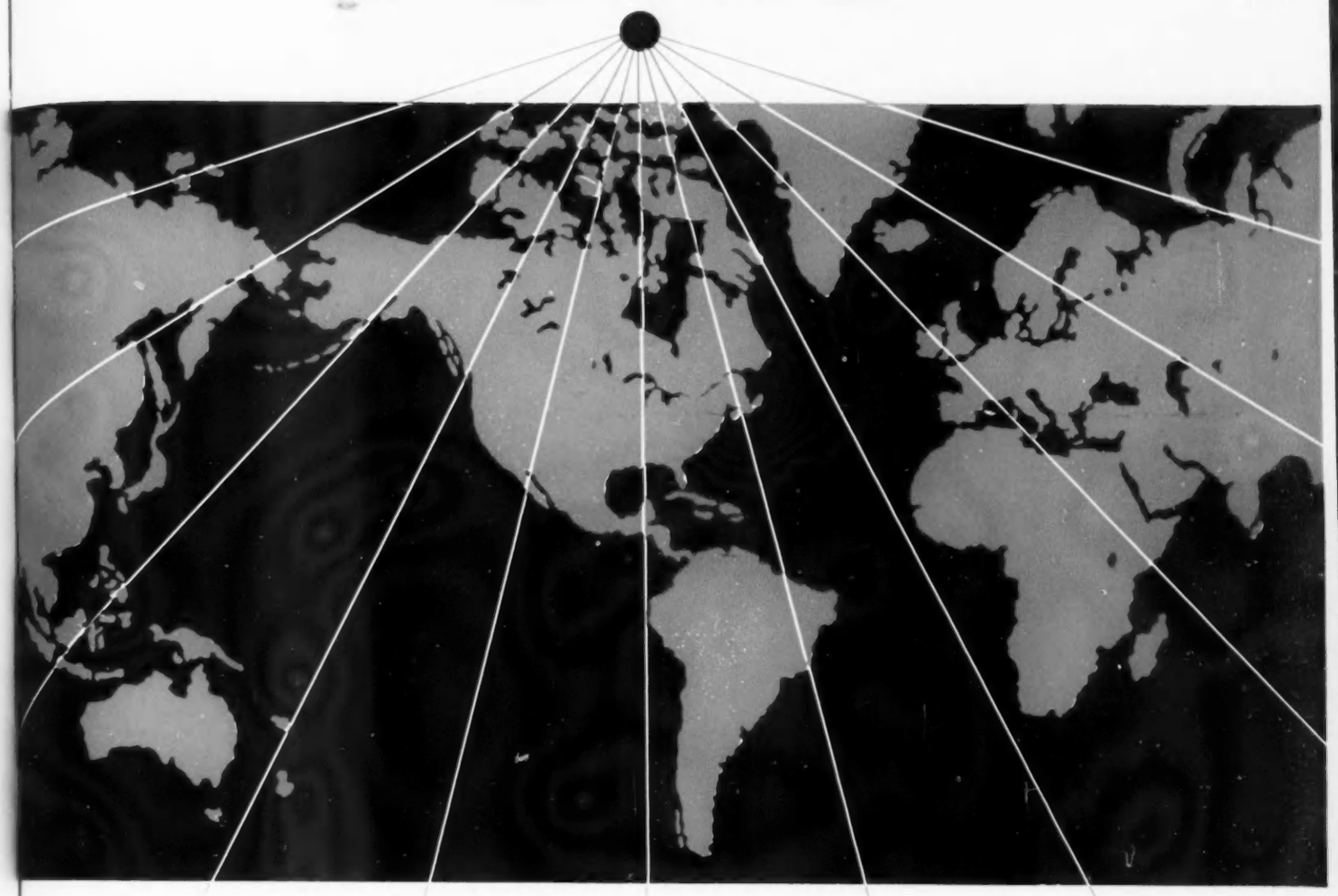

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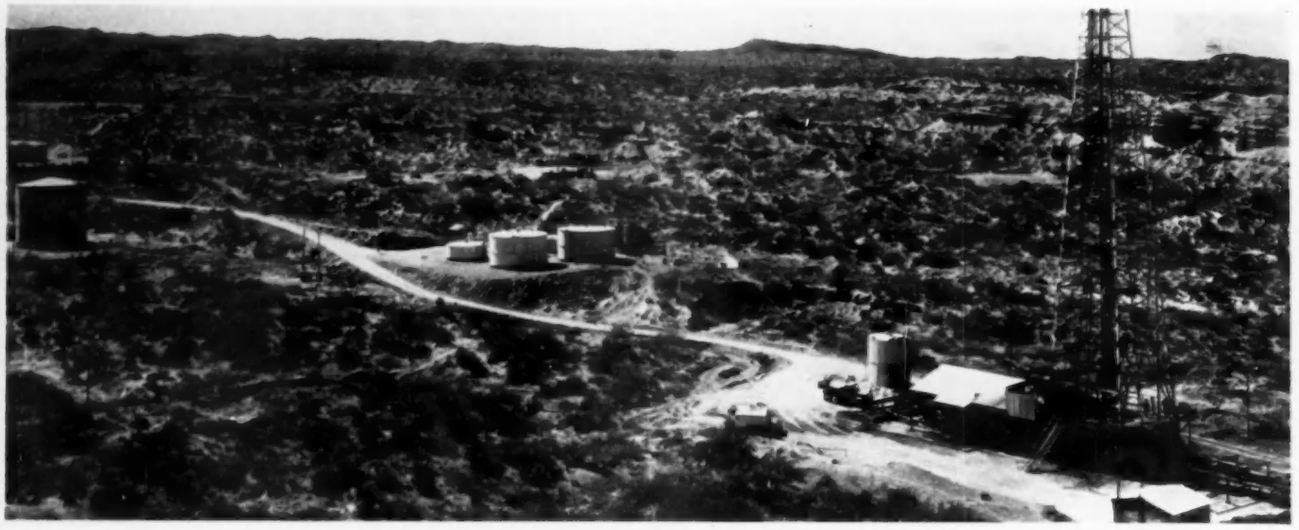


A well in the Tupungato field, Mendoza

TABLE 2

Y. P. F. Geological and Geophysical Work During 1945

Provinces and Territories	Geological Parties	GEOPHYSICAL CREWS			
		Gravity	Magnetometer	Refraction	Reflection
Buenos Aires		X	X	X	X
Cordoba		X			
La Rioja	X				
Mendoza	X				
Salta	X				
San Juan	X			X	
San Luis				X	
Santa Fe				X	
Santiago del Estero	X	X		X	
Tucuman				X	
Chaco		X		X	X
Neuquen	X	X	X		
Chubut	X	X			
Rio Negro					X
Santa Cruz	X	X			X

TABLE 3

Prospective Petroleum Bearing Sedimentary Basins in Argentina

(Producing horizons listed in capital letters are considered the most favorable)

BASIN	RATING	PROSPECTIVE PRODUCING HORIZONS
Salta	Producing	Tertiary, GLACIAL (Carboniferous) and DEVONIAN
Mendoza	Producing	Tertiary, TRIASSIC
Neuquen	Producing	Jurassic
San Jorge	Producing	UPPER CRETACEOUS, Lower Cretaceous, Jurassic
Santa Cruz	Probable	Tertiary, CRETACEOUS
Rio Negro	Possible	Tertiary, CRETACEOUS
Rio Salado	Possible	Tertiary, CRETACEOUS, PALEOZOICS
Chaco	Doubtful	Paleozoics (Carboniferous and Devonian)

during the war years. On the contrary, such work has been pressed most aggressively. In addition to work in the four principal producing areas, exploratory work has been done up through 1944 to the following extent:

Geological

Reconnaissance studies..81,750,000 acres
Topographic surveys....22,780,000 acres
Detailed mapping..... 4,686,000 acres

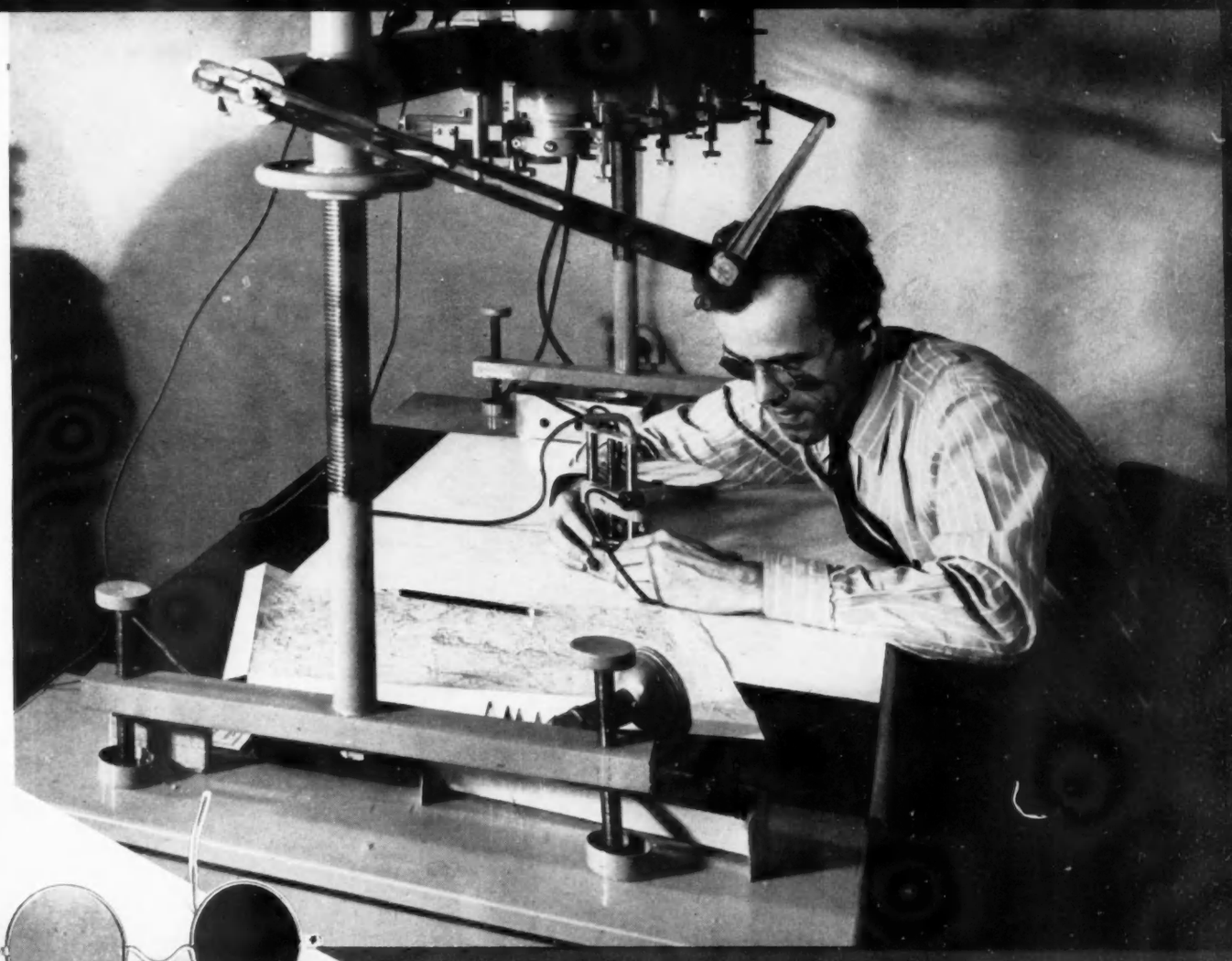
Geophysical

Torsion balance .....55,160,000 acres
Gravity meter .....40,593,500 acres
Magnetometer ..... 8,841,750 acres
Seismic refraction.....17,608,000 acres
Seismic reflection ..... 4,323,000 acres

In addition to a large geological staff, YPF at present is operating one magnetometer party, three gravity crews and six seismic crews. The latter consists of three for reflection and three for refraction work. Table 2 shows where these parties did work during 1945, and illustrates the widespread character of their search for new prospects.

With so much prospecting and restricted drilling, exploratory work has gotten far ahead of the drillers. It is reported that YPF is in the market for 20 new rigs and has approved more than 200 prospects for testing.

The map also shows the eight sedimentary basins regarded most favorable for petroleum prospects, in addition to which some geologists consider that the entire narrow north-south belt of Triassic rocks just east of the Andes has possibilities. These basins are listed in Table 3, with an indication of the relative degree of interest geologists exhibit in them and the formations considered most favorable for developing production.



Looking at the World

THROUGH RED AND GREEN GLASSES

The man in the picture is wearing an odd pair of spectacles — red glass for one eye and green for the other. He's wearing them for one step in producing an Ammann map by Multiplex methods.

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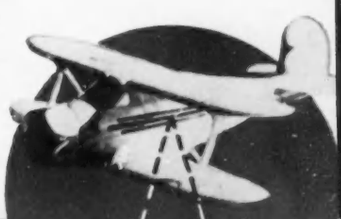

PRECISE AERIAL SURVEYS—CONTOUR MAPS—LAND SURVEYS
REGIONAL AND FEE MAPS—REPRODUCTIONS

JACK AMMANN

PHOTOGRAMMETRIC ENGINEERS

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Germany's Oil Fields And Synthetic Plants

Scholven Buer was one of two synthetic plants at Gelsenkirchen, Germany. Both plants were leveled by Eighth Air Force and RAF attacks. At Scholven only the bullet-shaped bomb shelter (left center) escaped without damage

By DR. J. BRIAN EBY
Consulting Geologist, Houston

Bomb-damaged refinery at Hamburg, Germany
—This photo and one on opposite page is from U.S.A.A.F.

PRIOR to and especially during the war, Germany's oil supply depended on three factors: its crude production, synthetic oil, and imported oil. By these three methods it reached a total oil income of about 100 million barrels annually in 1942 and 1943 at the peak of the Nazi regime. This was divided roughly into 8 percent crude production, 42 percent synthetics and 50 percent imports, the latter item coming largely from Roumania.

To better understand or visualize the component parts of Germany's oil income and expenditure from 1933 to the present, the graphic chart, Figure 1, is given. This chart is based on available information, but for the years 1939-1945 the only actual statistics found and used are those of crude production. Figures for synthetic and import oils during those years were largely destroyed or have not yet been sifted out. This chart was first used in THE OIL WEEKLY of April 17, 1944, in "Germany Fights for Oil." In bringing the chart down to date, it seems that the earlier estimate for the amount of synthetics manufactured was exaggerated. Instead of producing 45 million to 50 million barrels annually, it now seems to have been not more than 30 million to 35 million barrels, with 1943 the peak year of production.

The chart still does not answer the interesting question of where Germany got all the oil she must have used in nearly six years of war. There is quite a discrepancy between the consumption line and the cumulative production line. It does not seem possible that so much excess oil was stored in advance, as the records indicate stockpiling of crude and gasoline did not begin until 1935. The military use line is based on figures in the estimate of a Swedish newspaperman, Fredborg, who was in Berlin until the summer of 1943.

Germany's oil situation of 1946, as suggested on the chart, and as pointed out by THE OIL WEEKLY, International Section, December 3, 1945, page 46, reduces her total civilian consumption to a little over 14 million barrels for 1946. This is just over ½ the oil she used in 1933. To provide this bare minimum, she will produce about 4½ million barrels of crude, about the same of synthetic oil, and must import the rest.

The Germans made desperate efforts during the war to increase their oil supply. At times, the Seismos Company of Hannover had as high as 28 seismograph crews working in the favored North German plain area and in the oil sections of the occupied countries. The drilling and actual discovery of oil did not keep pace with geophysical findings, however, as many structures and salt domes were found, but disappointingly few new oil fields.

The map of German oil fields and salt domes given here shows a large number of salt domes and ridge-like structures and while many of these have been drilled, as shown, very few have been found to carry oil. During the war new oil fields were found in the Hannover area, the Dutch Border area near Coevorden in the Netherlands, and the Heide area northeast of Cuxhaven. These new fields are shown on the German map. One

Important Dates in the German Oil Industry

1430	First news of oil occurence at Tegernsee.
1546	Agricola mentions oil finds at Hanigsen.
1592	Oil occurrences at Lampertsloch is mentioned in Elsasser Chronik.
1670	Tar occurrence at Wietze are being exploited.
1830	Reichenbach distills Benzin out of oil.
1853	The first oil refinery at Galizien.
1858	Prof. Hunaus of Hannover drills the frist well in the world for oil at Weitze.
1860	The discovery of oil at Campina, Roumania.
1862	Discovery of oil field of Boryslaw, Poland.
1911	Bergius makes synthetic oil by applying high temperatures and pressure.
1917	German Deutsche Erdol-AG. introduces at Pechelbronn and Wietze the mining of oil.
1933—July 19-25	First World Oil Congress in London.
1934—May 12	The Prussian Legislation for exploration of oil and other minerals.
1934—Dec. 4	Legislation for exploration of Germany for oil and minerals.
1936—Oct. 20	Field Marshal Goering placed at the head of the German Petroleum idustry.
1937—June 13-20	Second World Oil Congress in Paris.
1939—Sept.	War declared. Germany invades Poland.
1940—Oct.	Roumanian oilfields captured.
1941—June	Russia invaded, a principal target the Baku oilfields.
1942—July	Germans drive 1,000,000 soldiers toward Russian Baku fields.
1942—Dec.	Germans defeated at Stalingrad and oilfields saved.
1943-1944	Allied bombardment of German synthetic plants and crude refineries.
1944—Sept.	Roumanian oilfield lost to Germany.
1945—May	Germany defeated.

gas field in the Dutch Border area, as shown on the map, also has been located. In spite of these discoveries however, as pointed out in THE OIL WEEKLY, December 7, 1945, page 48, International Section, Germany's crude production reached a maximum in 1940 and declined steadily thereafter.

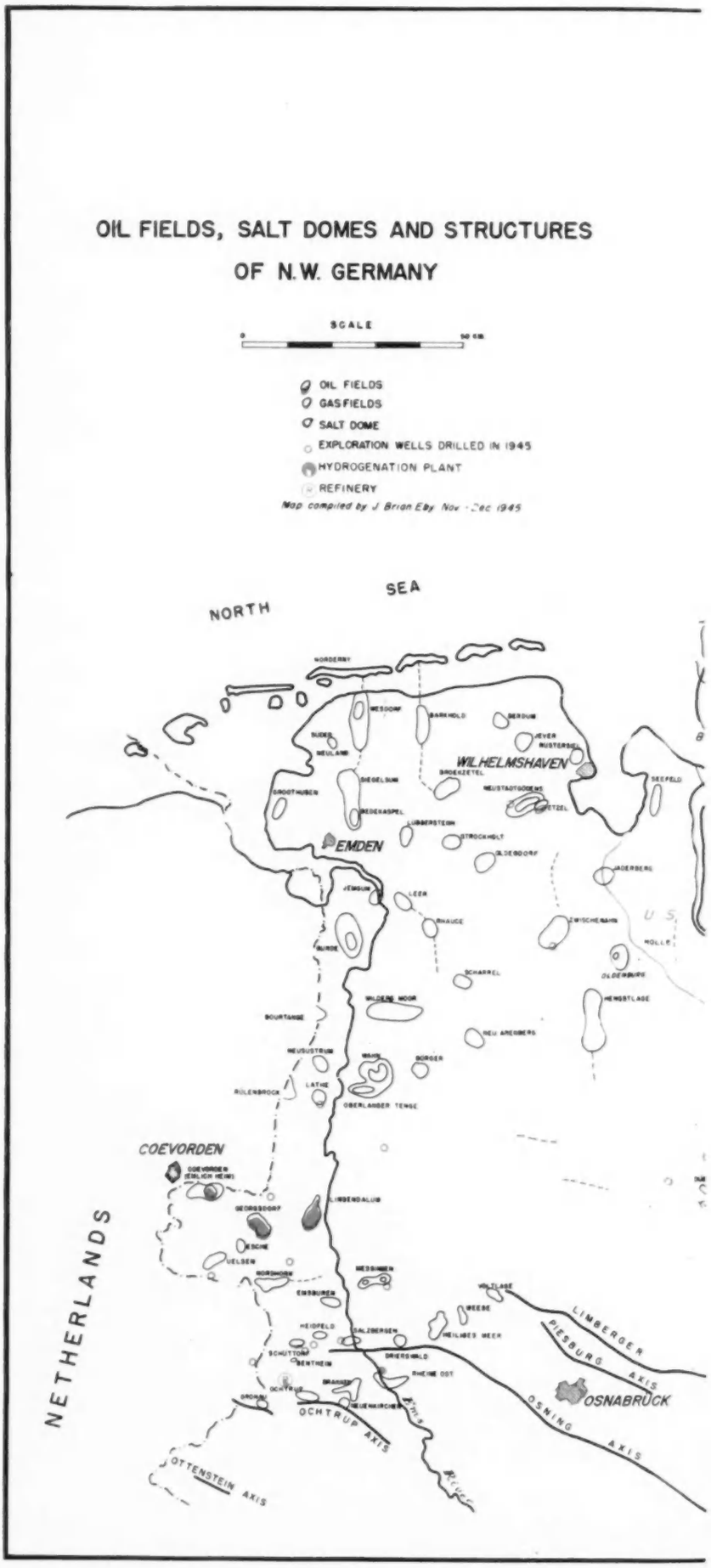
The synthetic oil plants of Germany played an important part in her war effort. For the same reason they were a prime target of Allied air power. The photographs given on page 19, THE OIL WEEKLY, January 7, 1946, International Section, show the Rothensee Braunkohle Benzin A. G. plant just outside of Magdeburg (see accompanying German map.)

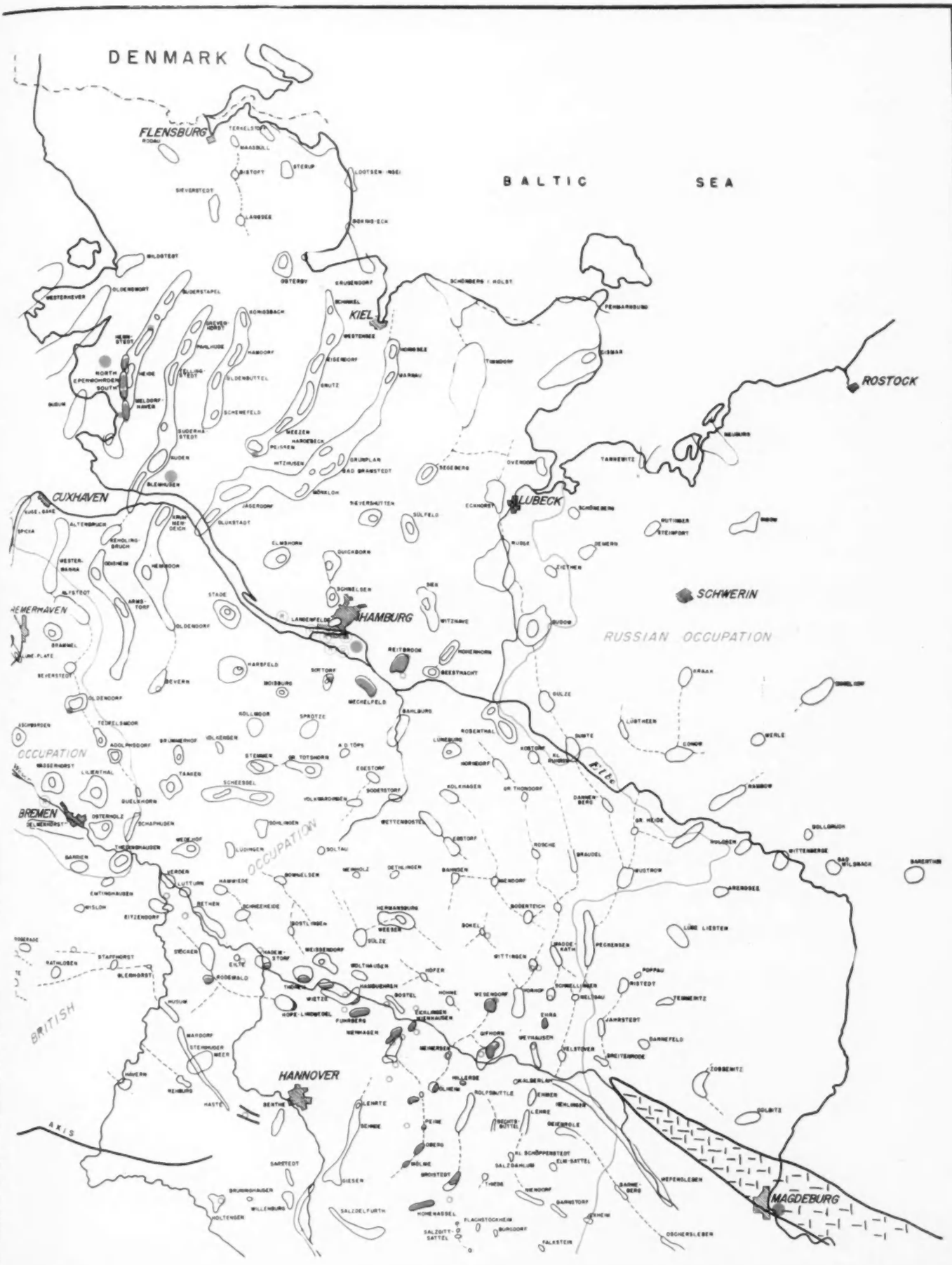
There were 12 hydrogenation plants operating in Germany during the war. There were nine synthetic plants using the Fischer-Tropsch method of hydrocarbon synthesis. The first group of plants produced primarily gasoline, especially aviation gasoline, and the second group produced largely synthetic crude oil. The names, locations and capacities of these plants are given in Table 1.

The hydrocarbon synthesis plants in Germany and their estimated capacities in terms of primary product (synthetic crude oil) are shown in Table 2.

In administering Germany, it will be seen that all the North German oil fields and the synthetic plants of the Ruhr district are in the British zone of occupation. All the synthetic plants of Silesia, Leipzig, Stettin and Magdeburg are in the Russian zone. With the exception of a small area around Bremen and the Weser estuary, the United States zone of occupation falls south and west of the oil field, oil plant areas.

The investigation of German industry has fallen into two rather distinct phases, one of which preceded, and the other of which followed upon the dissolution of Supreme Headquarters Allied European Forces July 13, 1945. Until the dissolution of SHAEF the investigations were carried out under the auspices of the Combined (i.e. Anglo-American) Intelligence Objectives Sub-Committee, and were primarily directed to securing information of military importance. Practically all teams during this period were composed of both British and United States investigators. With the dissolution of SHAEF, the CIOS was itself dissolved and replaced on the British side by the British Intelligence Objectives Sub-Committee (BIOS), which is composed of representatives of the various government departments interested in the investigation of German industry. These departments are responsible for selecting and sponsoring teams of experts to investigate the industries which are of interest to them. The




DENMARK
FLENSBURG
BALTIC SEA
KIEL
ROSTOCK
CUXHAVEN
LUBECK
SCHWERIN
HAMBURG
RUSSIAN OCCUPATION
BREMEN
OCCUPATION
OCCUPATION
BRITISH
HANNOVER
MAGDEBURG
AXIS
Elbe

Ministry of Fuel and Power (of which the head is the Right Honourable Emmanuel Shinwell, M.P.) has, of course, been responsible for the investigation of the German oil industry, and the officer specially charged with this work is A. R. M. Murray.

Since the dissolution of SHAEF the investigations have been gradually directed more to the object of securing information of value to civil industry, and some of the targets previously examined from the military point of view have had to be revisited. While the investigations during this period have been carried out by the British and American sides separately, arrangements have been made for the two organizations to exploit targets in each other's zones in Germany, and to receive each other's reports. The majority of the reports based on trips in both the CIOS and BIOS periods will shortly be released to industry and the technical Press of Great Britain. Both sides have agreed to observe any security classification placed on reports relating to trips undertaken since the dissolution of CIOS. Each side makes its own security classification for reports relating to trips undertaken during the CIOS period of operations.

Actually the oil fields of North Germany were not greatly damaged and immediately after Allied occupation their production was resumed. A detailed report of this production, including the new fields, is given in Table 3 for August and October, 1945.

Dutch Border Fields

The wartime discoveries of oil and gas near the Dutch border and inside the Netherlands near Coevorden are of considerable importance. The three principal oil fields are Georgsdorf, Lingen-Dalum, and Emlichheim. The gas field is called the Bentheim field and is near the town of that name and northwest of the city of Rheine.

The Georgsdorf field is on a subsurface anticline near Alte Piccardie. There are several flowing wells producing about 200 to 250 barrels daily of heavy oil.

The Emlichheim producing area is the German oil field just across the border from the Dutch Coevorden field. As in the case of Georgsdorf, there are several flowing wells making nearly 300 barrels daily. The Lingen-Dalum structure is making about 350 barrels daily.

The oil of all three fields is transported to refineries by rail. The field collecting is done by pipe line and truck. All drilling was done by rotary. Neither the fields nor equipment suffered during the fighting, the greatest delay to operation now being the lack of transportation and equipment.

Just across the German border in the Netherlands, at the town of Coevorden, a field of promising proportions is in the making. Working on captured geophysics and information and carrying out their own explorations, the Germans drilled the first oil well in Holland, spudding November 24, 1942, and completing as an oil well April 13, 1943. Commercial oil was found at about 3800 feet in what is reported to be the Portlandian formation of the Jurassic. The field was developed slowly. During July, 1945, it produced about 1200 tons (8400 barrels). The field is undoubtedly part and parcel of the German Emlichheim field.

The Betheim gas field is on a structure trending east-west and probably a continuation of the well-known Osning Axis. Before the close of the war, it produced 10 to 12 million cubic feet of gas daily. Much of this gas was being used to produce synthetic rubber and some for the use of motor cars and trucks. The wells had been heavily mudded as the fighting approached this area and after the occupation of the area by Allied troops, the field was found very little damaged.

The Oil Committee, on behalf of the Allied Control Authority, which handles all matters concerning the oil business in Germany, consists of Phillip Clover,

TABLE 1
Location and Annual Capacities of Hydrogenation Plants

PLANTS OPERATING ON	Location	Feed Stocks	Production Motor Gasoline Metric Tons/Year
Bituminous Coal and Tar			
Blechhammer North	Silesia	H. T. C. Tar	200,000
Blechhammer South	Silesia	Bit. Coal	300,000
Bottrop-Welheim	Ruhr	H. T. C. Tar	100,000
Gelsenkirchen	Ruhr	Bit. Coal	350,000
Poelitz	Stettin	Bit. Coal & Tar	600,000
Scholven	Ruhr	Bit. Coal	400,000
Lignite Coal and Tar			
Boehlen-Rotha	Leipzig	L. T. C. Tar	300,000
Leuna	Leipzig	Lignite and Tar	600,000
Luetzkendorf	Leipzig	L. T. C. Tar	125,000
Magdeburg	Magdeburg	L. T. C. Tar	250,000
Wesseling	Cologne	Lignite	200,000
Zeits-Troeglitz	Leipzig	L. T. C. Tar	350,000
TOTAL			3,775,000 (30,200,000 bbls.)

The foregoing figure is a maximum capacity rating, actually the products from the above plants were about as follows:

Product	Metric Tons Per Year
Aviation gasoline	1,050,000
Motor gasoline	1,725,000
Diesel oil (and kerosine)	700,000
Lubricating oils	100,000
TOTAL	3,575,000

TABLE 2
Hydrocarbon Synthesis (Fischer-Tropsch) Plants
Location and Annual Capacity in Metric Tons of Primary Product

PLANT	Location	Feed Stocks	Annual Capacity Metric Tons
Castrop-Rauxel	Ruhr	Hard Coal or Coke	60,000
Deschowitz—(Odertal)	Silesia	Hard Coal or Coke	60,000
Dortmund	Ruhr	Coke Oven Gas	60,000
Holten-Sterkrade	Ruhr	Hard Coal or Coke	80,000
Homberg	Ruhr	Hard Coal or Coke	80,000
Kamen	Ruhr	Hard Coal or Coke	60,000
Luetzkendorf	Leipzig	Lignite	80,000
Ruhland-Schwarzheide	Leipzig	Lignite	180,000
Wanne Eickel	Ruhr	Coke and Gas	60,000
TOTAL			720,000 (5,040,000 bbls.)

TABLE 3
German Crude Production in Tons in August and October, 1945

FIELDS	August	October
Neinhagen:		
Elwerath	9,448	8,793
Eicklingen	1,135	1,103
Itag	264	271
Dea	156	377
Wintershall	2,200	2,147
Vacuum	109	50
Wesendorf	5,180	5,509
Moelme	630	616
Hohenassel	3,700	3,812
Berkhoepen-Oelheim	280	260
Broistedt	250	186
Reitbrook	2,656	3,146
Meckelfeld	160	229
Haegisen	3,386	3,543
Oberg	509	847
Rodewald	2,291	3,805
Lingen-Dalum		2,413
Weitze, heavy	1,020	1,720
Weitze, light	45	149
Thoeren, heavy	100	1,130
Thoeren, light	1,050	840
Georgsdorf	600	1,658
Hademstorf	300	572
Etzel		250
Hambuehren	202	263
Gifhorn	20	238
Fuhrberg	1,700	4,529
Emlichheim		335
Heide	7,411	7,785
TOTAL	44,802 tons (313,614 bbls.)	56,576 tons (396,032 bbls.)

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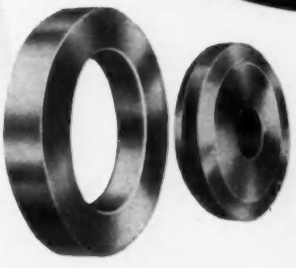

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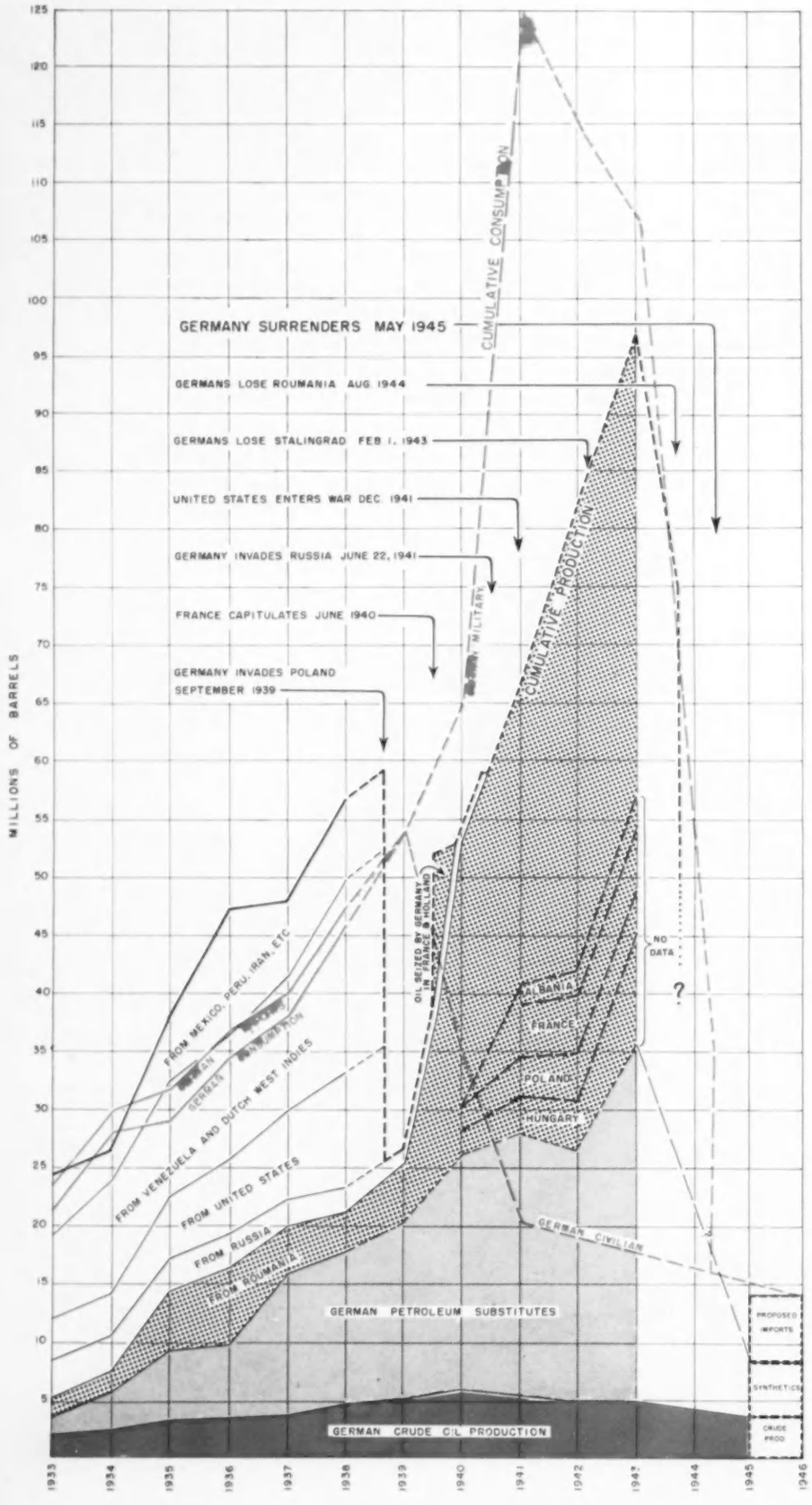

Figure 1. The relation between German oil consumption and German oil supply during years 1933 to 1946.

United States representative; L. W. Harford, British representative; A. K. Simakof, Russian representative; and Colonel Pierre Manard, French representative.

Four executive assistants form the Oil Sub-Committee and consist of 1st Lieut. George L. J. Dalferes, United States; Mrs. Pauline Fenley, British; Major Gregoriev, Russian; and Capt. DeRochefort, French.

In practice, the sub-committee may meet as often as several times a week to discuss impending problems and routine operations and to make recommendations to the Oil Committee. The Oil Committee meets periodically and then establishes the policies to be pursued, or changes in program. Each member of the Oil Committee is then responsible for these policies being carried out in their respective zones.

Production Future

The future for German oil production is now the problem of the Allied Control Council, composed of the four major powers, which meets in Berlin. As pointed out before (see General Draper's letter, THE OIL WEEKLY, December 3, 1945, page 46, International Section), American policy is to eliminate German synthetic plants as a war potential. At the moment, however, it is reported the Russian (German) synthetic plants are operating on a small percentage basis but solely as a matter of expediency and realistic necessity. The disposition of plants in the British zone is being considered. Bomb damage is considerable but the real bottleneck is lack of coal and transportation. Until these last two factors can be improved, little development in the oil industry of Germany can be expected.

The Shell and Socony-Vacuum groups are the two principal oil companies whose properties in Germany were seized, used, and in many cases destroyed. Both government and oil company officials, surveyors, technicians, and geologists are examining the various oil fields and installations. Due to the foregoing conditions, the actual oil output of 1946 may be even less than 1945 unless some unusual discovery takes place. However, since exploratory drilling is at a standstill, it is difficult to see any immediate progress in this direction. Oil will have to be brought in to fill the most elementary needs of the local civilian population. The amount of this imported oil, about 4½ million barrels, is in itself a problem. This does not provide for reconversion of industry or commercial expansion. This is just living oil. What oil it will take to restore some form to German industry, which should be done, is yet to be decided.

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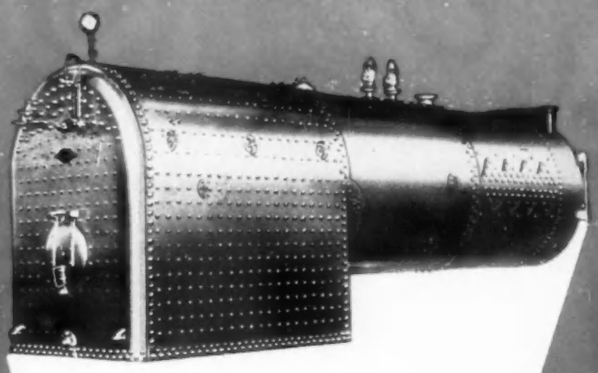

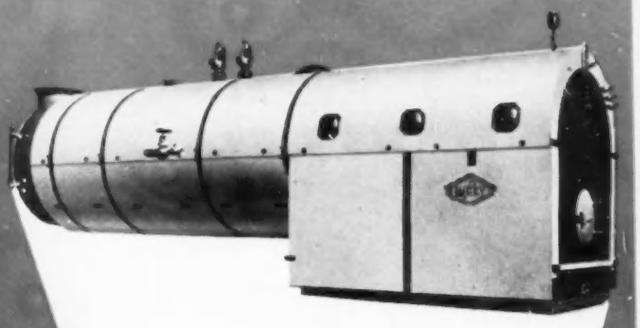

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Exploration in Western

By J. ELMER THOMAS

An amphibious plane serves the houseboat headquarters on the Cayapas River for field parties and drilling crews.

Trucks crossing corduroy road built by the company across swamps in the Province of Esmeralda.

Bulldozer making trail in Esmeralda Province.

ECUADOR produced its first oil more than 30 years ago, but so far all the country's producing areas remain confined to the Santa Elena Peninsula, the extreme western tip that juts into the Pacific Ocean.

Currently, The International Ecuadorian Petroleum Company (Imperial Oil Company of Canada and Standard Oil Company [N. J.]) is doing the only wildcatting in Western Ecuador, although Shell Oil Company of Ecuador is seeking production in Eastern Ecuador (see THE OIL WEEKLY, January 7, 1946). However, the operations of International Ecuadorian are highly interesting in that they are comprised of deep tests.

Production History

On the north shore of the Santa Elena Peninsula numerous oil seepages had been noted and some crude obtained as early as 1914 by hand-dug pits, some of which are still utilized. This work, originally carried out by Ecuadorians, was observed by some British residents of Ecuador and in 1916 the firm of Milne, Williamson & Company, of London, acquired holdings. These were transferred in 1919 to the Anglo-Ecuadorian Oilfields, Ltd., which remains the dominant operator, owning nearly 85 percent of the entire output and controlling an additional 5 percent or more, owned by domestic companies, through management contracts.

Until 1917 a total of 17,000 barrels were reported to have been recovered, principally from these hand-dug pits, some of them only ten to 30 feet in depth. In 1923 a well good for 45 barrels per day was completed and the drilling thus stimulated brought the district's annual producing up to 87,000 barrels, increasing to 350,000 barrels in 1926.

Deeper drilling, usually to horizons at 1500 to 2500 feet, discovered other producing areas and additional pay zones and this situation has characterized Ecuador's discovery efforts up to the present time. By 1928 Ecuador's annual production attained the 1 million barrel mark, and in 1937 it reached 2 million barrels annually for the first time. With the exception of 1941, when a serious slump occurred, the country's produc-

Ecuador

Deeper Drilling Brings Steady Rise In the Nation's Production Total

tion trend has been rising almost every year. A peak of 2,967,000 barrels was produced in 1944. However, output in 1945 will be below the 1944 record, estimates placing 1945 yields at 2,708,000 barrels. In October, 1945, Ecuador Oilfields, Ltd., brought in a well good for 300 barrels daily from 4000 feet in its north portion of the El Tigre field.

Output for the past five years, with total cumulative production, is shown by companies in Table 1. Two British companies, Anglo-Ecuadorian Oilfields, Ltd., and Ecuador Oilfields, Ltd., own most of the country's production. Three Ecuadorian companies (Carolina Oil Company, Petropolis Oil Company and Concepcion Ecuadorian Oilfields, Ltd.) have made management contracts with Anglo-Ecuadorian to operate their properties, the last named having been taken over by Ecuador nationals from an Italian group. International Ecuadorian Petroleum Company has only a few barrels per day production remaining from earlier operations in this country, from which it subsequently withdrew, only to return five years ago with an active drilling campaign in wildcat areas.

In the producing areas the oil is reported as filling fractures in the Eocene sands which are not themselves impregnated. Some observers have thus been led to ascribe the oil's origin to older formations, possibly of Cretaceous Age. In the Lower Eocene is a very thick member, the Sucre sand, which has been penetrated for 3000 to 4000 feet without passing through it. The usual practice is to drill into it for 300 to 400 feet and abandon if no oil is found. International is drilling in search of higher Tertiary pays with oil from younger source rocks than that to which is assigned the present production in the Santa Elena Peninsula.

Coastal Search

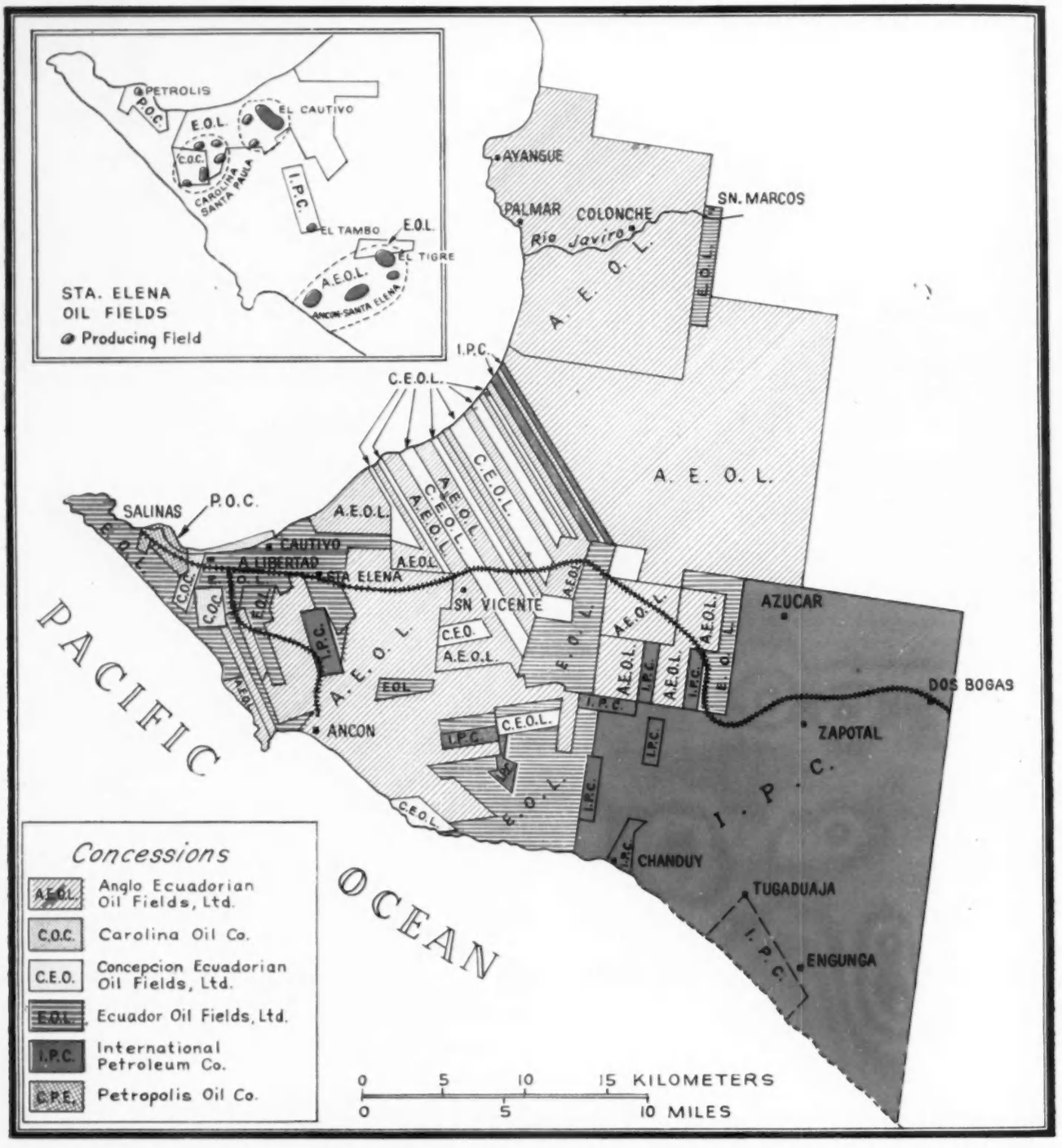
In its current search, The International Ecuadorian Petroleum Company has been active along the coast from Isla Puna, Bay of Guayaquil, near the Peruvian border on the south, to the Colombian border on the north.

Much swampy marsh land occupies that coast, occasionally interrupted by some fairly high hills, but the mountain ranges are well to the east. While conditions along the coast do not require

Camp constructed for laborers at Daular 2.

Bajada 1, deepest test in South America, which was nearing 12,000 feet at last report.

Esmeralda village, principal town and port of Northern Ecuador.



Concessions and oil fields of St. Helena Peninsula, Ecuador.

the use of airplanes to move in materials and equipment, nevertheless, there were many obstacles to transportation. Moving supplies by water has offered a solution where rivers and streams could be utilized. The company has a comfortable houseboat which serves as a "camp" variously for geologists, geophysical parties and drilling crews. Supplies and equipment are carried to its temporary mooring sites and a company speed boat and amphibious plane is used for rapid communication.

On dry land the invaluable bulldozer forces paths through the jungle and makes roads over which seismic equipment may be moved. Later these roads have to be improved to permit the passage of heavy trucks hauling drilling equipment. These dry land roads are sometimes interrupted by marshy areas over which corduroy roads must be constructed. The opening of such roads, of a temporary but sometimes permanent character, is another one of the several indirect contributions an oil company makes to an undeveloped country. A country's economy is thereby advanced and improved, since highways and communication lines must precede intensive settlement, and the oil companies provide many such "highways" through districts previously impenetrable.

Several sedimentary basins, of restricted size but with great thicknesses of Tertiary sediments, are situated along the coast of Ecuador and deep drilling is the order of the day. International's Bajada 1, Guayas Province, 45 miles

The International Ecuadorian Petroleum Company occupies this building in Guayaquil.

Structure core-drilling in Guayas Province.

west of Guayaquil, was drilling at 11,300 feet early in December still in Eocene, and is believed to be already the deepest test ever drilled in Latin America. Just west of it, International's Rodeo 1, Guayas Province, had reached 9400 feet and was drilling deeper.

Another deep test, International's Daular 2, Guayas Province, 25 miles west of Guayaquil, was abandoned in 1945, still in Eocene. A feature of these wildcat installations is the substantial quarters usually constructed by the company for the health, comfort and convenience of the personnel, who will reside there only during the drilling of a single test well, if it is a failure. These consist of a group of houses at the main camp for the permanent staff employes, other individual units or dormitory-type barracks for the temporary laborers.

International keeps three drilling rigs at work in the area and 17 tests have been completed in the last five years, so far without favorable results. Some very sizeable faults have been encountered and some complicated and abrupt changes in stratigraphy disclosed, such as frequently occur in deltaic deposits. Just east of the basin which occupies the tip of the Santa Elena Peninsula, which has furnished all of Ecuador's oil production to date, is a strong fault with several thousand feet of displacement, and a much deeper basin in which International has drilled several tests. The pools near the tip of Santa Elena Peninsula are reported to be stratigraphic traps, irregular sand lenses, sometimes sealed in part by faults, and such anomalies are most difficult to locate by geological and geophysical research. And when the prospective drilling depths increase, to that hazard must be added heavy drilling costs.

At present the only wildcatting in Western Ecuador is being done by International, which took originally "study concessions" covering wide areas, several million hectares. These are progressively reduced as their surveys are completed. At the beginning of 1945 its active holdings totaled 2,350,000 hectares but by the year end these had been reduced to about 1,800,000 hectares. Most of this was obtained directly from the Ecuadorian Government, but a sizeable portion was acquired from a previous concessionnaire, Compañia Mineria de Petróleo Pacifico. Its ownership was not well known but it was noted with some interest that it was using Japanese geologists.

Other tracts had been held by German nationals, the Otto Wolff interests and others, but these have passed into the hands of Ecuadorian citizens. Francisco Illesca Barreira, Ecuador's ambassador to Argenina, controls two domestic oil producing companies, Concepcion and Petrópolis, which held concessions covering 200,000 hectares on the Peruvian border not far north of the producing areas in the Talare District of Peru. His producing properties are operated under a management contract by Anglo-Ecuadorian Oilfields, Ltd., a British company allied with British Controlled Oilfields in Venezuela and Lobitos Oilfields in Peru, and it seems likely that it also may take charge of his exploratory work on these concessions.

Neither of the British producing companies hold any wildcat concessions, which seems surprising in view of the fact that the country's production, after scoring a substantial advance from 1941 to 1944, showed a marked decline in 1945.

TABLE 1

Crude Oil Production in Ecuador by Companies in Recent Years

(Figures in Barrels)

	Anglo-Ecuadorian	Ecuador Oilfields	Carolina Oil Co.	Concepcion Ecuadorian	Petropolis Oil Co.	International Ecuadorian	Total
Through 1940	23,042,000	744,000	621,000	146,000	32,000	9,700	24,594,000
1941	1,104,000	350,000	63,000	66,000	17,000	700	1,601,000
1942	1,704,000	396,000	60,000	96,000	85,000	500	2,343,000
1943	1,711,000	372,000	45,900	78,000	171,000	700	2,378,000
1944	2,151,000	561,000	36,000	91,000	126,000	700	2,967,000
1945 (Est'd.)	1,999,000	425,000	51,000	109,000	123,000	800	2,708,000
Through 1945	31,712,000	2,849,000	877,000	586,000	554,000	13,100	36,595,000

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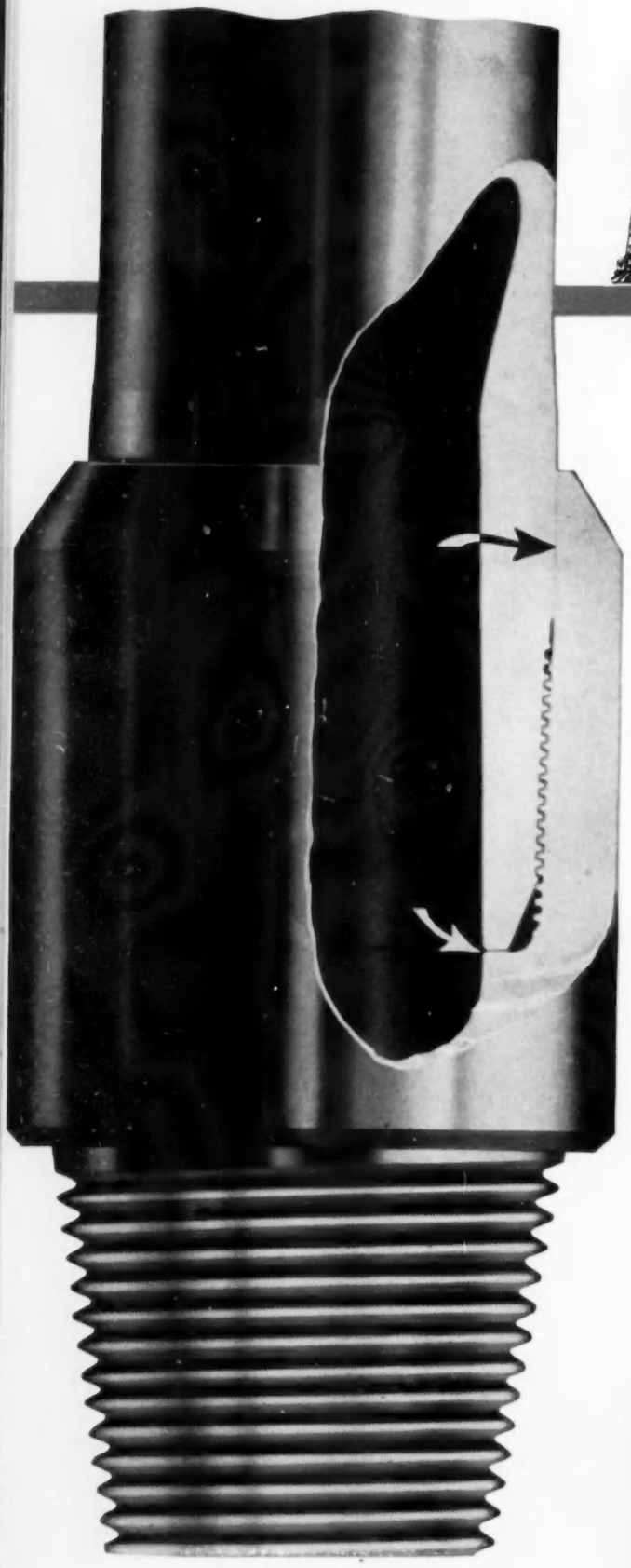

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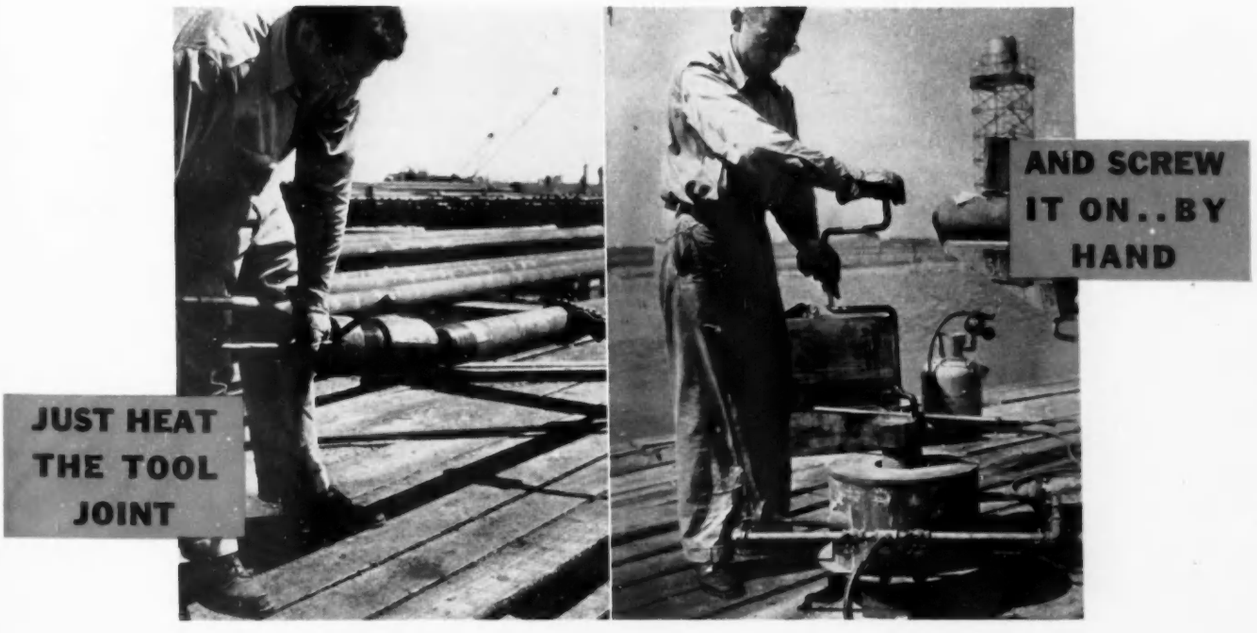

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Third Annual Meeting of the Permanent International Council of ISAP at Buenos Aires. Left to right, Augustin Maggi, delegate from the South American Union of Engineering Societies; Carlos R. Vegh Garzon, president of the International Council and of the Uruguayan Section; Enrique P. Canepa, president of the Argentine section; Hector Marchant, B., president of the Chilean section; Dr. Carlos E. Velarde, representing the president of the Peruvian section; Jorge T. Lavadenz, president of the Bolivian section; at the rear, German E. Villar, secretary-general of the Council.
ISAP Photo

Service to the Industry Is the Aim of This South American Organization

AN ORGANIZATION which bids fair to become of increasing importance in, and service to, the oil industry is the Instituto Sudamericano del Petróleo (South American Petroleum Institute).

Founded four years ago by a group of men active in the oil industry in South America, in various branches and in several countries, it has steadily broadened its scope in an ambitious program to serve the same needs as does the American Petroleum Institute in the United States. International headquarters are presently maintained in Montevideo, Uruguay, and branch offices have been established for national chapters as follows: for Argentina in Buenos Aires, for Chile in Santiago, for Bolivia in La Paz, for Peru in Lima, and for Equador in Quito. Arrangements are now under way to add district offices in Venezuela, Colombia, and other countries in South America and possibly Central America as well.

The Permanent International Council holds annual business meetings near the beginning of each year, with several officers in attendance from each of the National Sections and the staff of the International Headquarters, now in Montevideo. The next one was scheduled for Santiago de Chile late in January. One of the principal points on the agenda was plans and preparation for their first International Congress, now tentatively set for Lima in February, 1947.

National Sections hold business, technical and social meetings in accordance with the needs and desires of their local members. On December 13, 1945, the Argentine Section held a reception and banquet in the quarters of the Argentine Automobile Club at Buenos Aires. Present were 165 members and guests, including the presidents of all the oil companies operating in Argentina. The purpose of the meeting was to stimulate interest in ISAP, increase the membership of the Argentine Section and plan activities which would make the Institute more valuable to the oil industry in South America. Prominent among these latter were plans now under way to improve the collection and dissemination of statistics on oil operations in all South American countries. Again in this regard ISAP is endeavoring to follow in the footsteps of the API whose work is well known and highly appreciated in regard to standardizing the important basic statistics of the oil industry, and particularly in organizing the best means for their prompt publication so that the information can be of the greatest benefit to the oil industries and to the countries in which they operate. This latter point is one to which more attention might well be given in several South American countries.

Carlos R. Végh Garzón, the originator of the movement, is president of the

At ISAP headquarters, Montevideo, Uruguay, left to right: J. Elmer Thomas of THE OIL WEEKLY; Carlos R. Vegh Garzon, international president of ISAP; and German E. Villar, general secretary. ISAP Photo

Permanent International Council and of the Uruguayan section, maintaining offices at Avenida Agraciada 1464, 9th floor, Montevideo. Mario L. Villa heads the Argentina section, Héctor Marchant B., the Chilean section, Luis F. Diaz the Peruvian section, Jorge T. Lavadenz the Bolivian section, Coloma Silva the Equadorian section, and Augustin Maggi has been named delegate to the South American Association of Engineers.

Honorary Members

Three men at the head of other prominent associations have been named honorary members. They are William R. Boyd, Jr., president of the American Petroleum Institute, F. H. Garner, president of the Petroleum Institute of London, and José L. Puzzeti, president of the South American Association of Engineers.

The executive committee at the Montevideo headquarters includes, in addition to President Végh Garzón, Coronel Tydeo Larre Berges as treasurer, Salvador Masson as counsel, and Germán E. Villar as general secretary. Washington P. Bermudez of the Uruguayan embassy at Washington, has been named representative in the United States for the institute.

The dominance of technical men is at once noted in the directorate and in the publications of the institute. Notwithstanding the difficulties inherent in the war period just passed, the institute has managed to show steady growth and to issue most worthy publications. These include, in addition to several creditable periodic (quarterly) bulletins from the Montevideo headquarters, occasional pamphlets from the Argentinan and Ecquadorian sections, with more scheduled to follow soon. All are in Spanish.

Illustrative of the broad extent of the subjects covered by the earliest publications, the following titles may be cited:

When the Institute Sudamericana del Petroleo (ISAP) was organized there were indications it might have more political than technical implications, and consequently there were many who wondered if they should become associated with it. If it is to be a political institution, its usefulness is limited from the beginning and its doom from the standpoint of its contribution to science is assured.

Now we are told that its purpose is scientific, that it will have no political implications and in the belief that such assurances are well founded THE OIL WEEKLY has been glad to commend it and to associate itself with the organization.

There is a great field for a petroleum institute in South America which seeks to increase the technical knowledge of its members, and which genuinely seeks to broaden the field and service of the industry served. We hope that no narrow nationalistic or hemispheric attitude will ever be allowed to interfere with the future of the institute. —The Editor.

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Vol. 1. No. 1. April, 1943.

Editorial—*The ISAP at the Service of South America.

†Uruguay—The ANCAP Oil Refinery (illus.).

†Argentina—The Y.P.F. Research Laboratory (illus.).

*Geographical Distribution of Oil Fields in S. A.

Peru—The General Status of Peruvian Oil Fields at the End of 1942.

Uruguay—Consumption of Crude Oil and Refined Products during 1942.

Vol. 1. No. 2. December, 1943.

Bolivia—A Petroleum Producing Country.

†The Oil Fields of Bolivia.

Oil Operations in Bolivia.

†Ecuador—Oil Explorations in Eastern Ecuador.

Vol. 1. No. 3. April, 1944.

*Geology—The Eastern Regions of Ecuador.

†Economics—Some Petroleum Statistics for South America and the World.

War—Petroleum and The World War. (Wm. R. Boyd, Jr.)

*Colombia—The Oil Industry in Colombia.

The Petroleum Crisis in Colombia, with Crude and Refined Statistics for 1943.

Chile—The Consumption of Liquid Fuels in Chile During 1943.

Near East—The Projected Pipe Line

* Important articles.
† Most important articles.

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Some ISAP executives. Left to right, Mario L. Villa, president of the Argentine section; Enrique Coloma Silva, president of the Ecuador section; Jorge T. Lavadenz, president of the Bolivia section; and Luis F. Diaz, president of the Peru section. ISAP Photos

from the Persian Gulf to the Mediterranean.

Vol. 1. No. 4. September, 1944.

Organizational—Officers of the ISAP.
Second Meeting of the Permanent International Council.
Proceedings of the Meeting in Montevideo, April 10-14, 1944.
(Various notes on business matters)

*General—The Oil Industry's Status at the Present Time.

Vol. 1. No. 5. February, 1945.

Editorial—Outlook for the Oil Industry in South America.

*Ecuador—An Outline of the Geology of Eastern Ecuador.

*Paraguay—Contract Between the Government of Paraguay and the Union Oil Company of California for the Exploration and Development of Oil in the Chaco District.

†Bolivia—Notes on the Petroleum Industry in Bolivia (illus.).

Ecuador—Status of the Production, Consumption and Imports of Crude Oil and Refined Products in Ecuador in 1943 and First Half of 1944.

*Chile—Petroleum in Chile (illus.).

Vol. 2. No. 1. August, 1945.

Editorial—The First South American Oil Congress Scheduled for Lima, Peru, in January, 1947.

Organizational—Proceedings of the Meeting of the Permanent International Council, Buenos Aires, March 22-25, 1945.
Entertainment Provided for Those Attending the Meeting.

General—The Expanding Outlook for the Future of the Oil Industry in S. A.

*General—The Uses of Petroleum in Antiquity.

Ecuador—Outlook of the Political Situation in Ecuador's Oil Industry.
Food and Medical Attention in Eastern Ecuador.
Problems Concerning the Preparation and Conditioning of Mud for Drilling.
Problems of Controlling the Subsurface Formations During Drilling.
*Notes on the History of Micropaleontology in Ecuador During the Past Fifty Years.

General—The Importance of Cracking in the Oil and Chemical Industries.
*The Importance of Aerial Transport to the Oil Industry.
The Markings of Boundaries (Concessions) in Forests.

Geology—The Techniques and Methods of Micropaleontological Correlations.

Uruguay—The Movement of Liquid Fuels in Uruguay During the World War.
The Consumption of Petroleum Products and Derivatives in Uruguay During 1944.

The State Assurance Bank Building, Montevideo, where ISAP has its headquarters.
ISAP Photo

These papers, together with those published by the geographical branches of ISAP, are well illustrated by photographs, maps and charts, and offer much of interest to anyone who desires to follow the developments in the oil industry in South America. Membership is open to any person or corporation interested in its technical, commercial or educative features. Many members have been elected from various countries in South, Central and North America. Where no branch exists in their country as yet, they become members of the International Organization, and dues ($2.50 U. S. annually) include a subscription to all publications issued by the headquarters unit.

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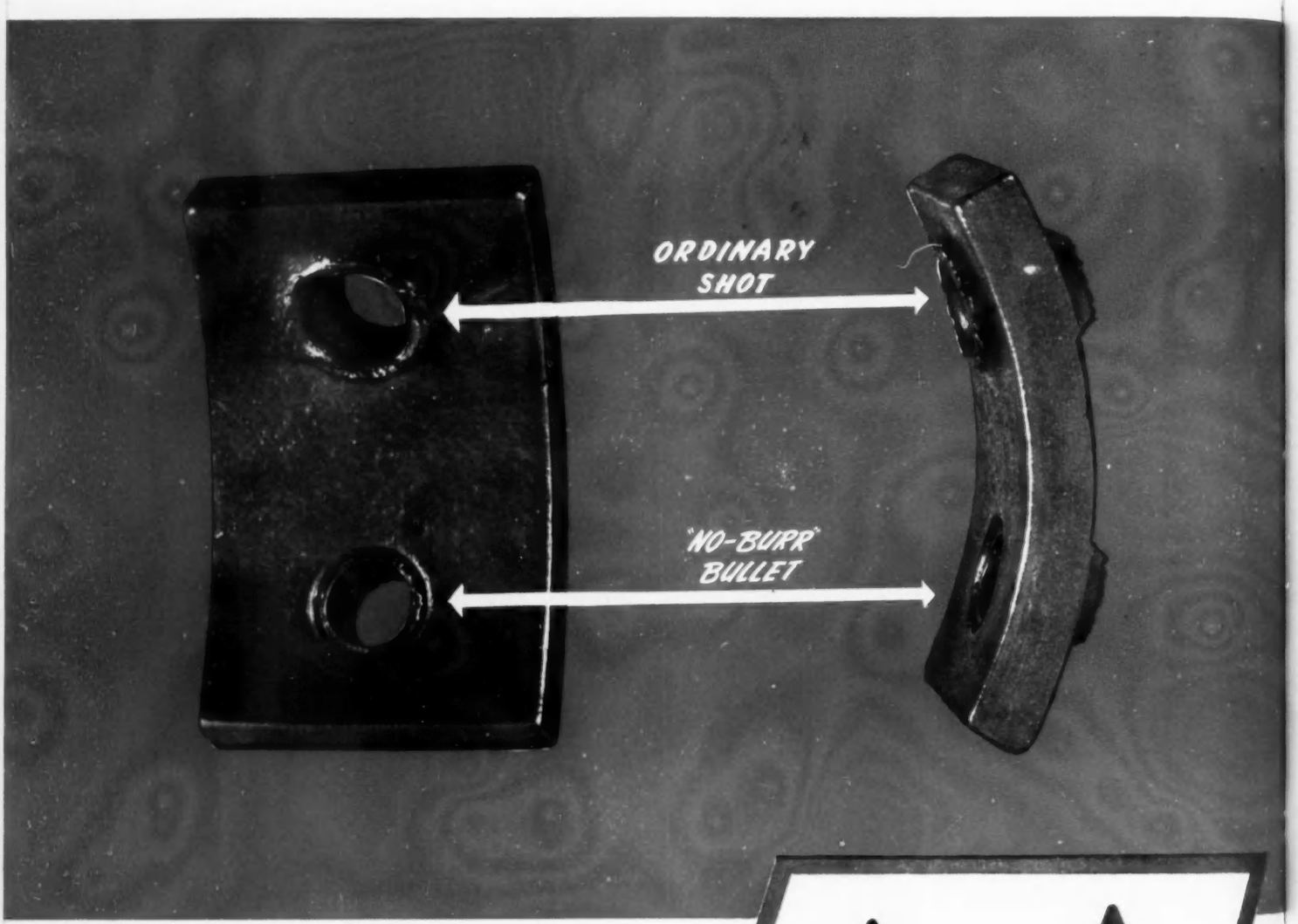

Note in the un-retouched photographs above how the "NO-BURR" perforations—in contrast to the ordinary bullet hole—leave no steel burrs on the casing wall to damage packers or other bottom hole completion equipment. The "NO-BURR" bullet, illustrated at right, consists of a standard Schlumberger bullet to which is attached a soft metal cap. When the bullet is fired the cap contacts the wall of the casing to prevent formation of a burr.

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Oil operators have found that moving into a new country is a venture that requires many millions of dollars and years of work.

Problems of New Operators In South America

By GEORGE O. IVES, Staff Writer

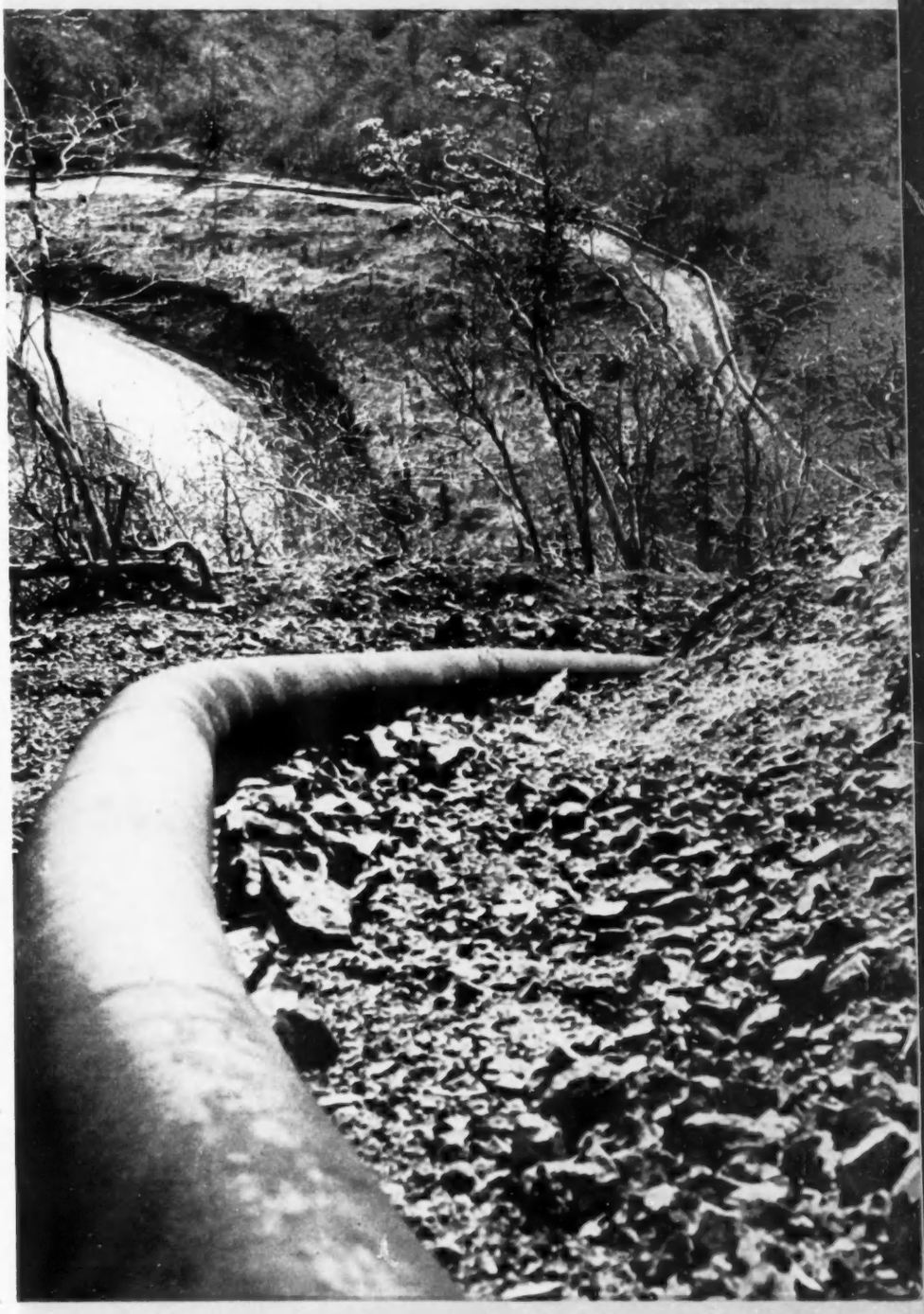
IN RECENT years many American oil companies have thought of entering South America to share in the expected oil prosperity to come in Colombia and Venezuela. Both of these countries have good chances of discovering substantial quantities of new reserves. Both, in spite of the fact that they have been producers of oil for more than 20 years, have great unprospected areas, which in view of the success enjoyed by some companies, offer tempting inducement to firms that are substantial producers in the United States, but would like to augment their reserves in foreign countries.

The problems faced by such operators are many, and they have found that there is no way yet discovered for moving into one of these countries in a small way. They have found that serious consideration must be given to such a venture, because to move in means a gamble which runs into many millions of dollars, and many years of time before a return may be expected on the investment, even if their search for oil is successful.

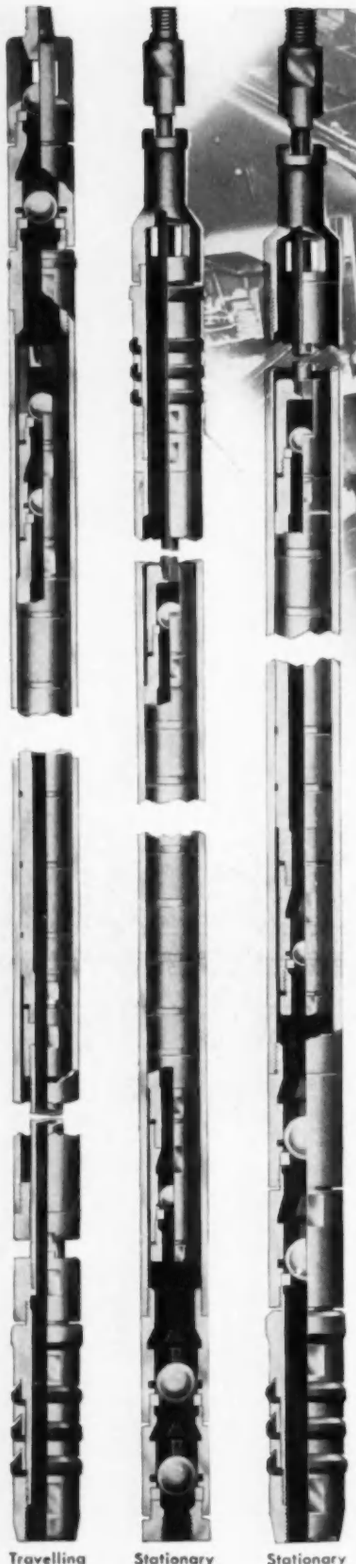
Groundwork Laid

To some extent, and in some areas, their problem has been somewhat simplified in that they have the observation of years of experience on the part of the companies already operating in the area and may be expected to avoid many of their mistakes. On the other hand, they are competing with these same companies in an area where the older companies have learned the ropes the hard way and have an advantage in the race to convert undiscovered reserves into factual reserves.

Most types of geophysical work now in use in the United States are used in South America, and the work is far more expensive than in the United States. With the volume of exploration by geophysical means now in progress in the two countries, not the least of the problems encountered by a new operator is finding experienced men. In the United States a crew chief must be thoroughly familiar with the geophysical work. In South America this is not enough. He must be a man who is capable of turning out a good job by devoting only a small percentage of his time to the work itself, because he will find



Typical terrain through which roads and pipe lines must be constructed. With the exception of the Lake Maracaibo area, all Colombia and Venezuela fields involve mountain and jungle transport.



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himself more concerned with problems of labor, transportation and supply.

Operating in the Lower Magdalena Valley area of northern and central Colombia, a company will find that it is necessary to maintain personnel whose sole responsibility is to look after detail work relating to relations between labor and company, between government and company, and government and labor. Labor itself is a huge item. A typical field crew running one seismograph instrument in this territory will consist of a staff of six to eight foreign technicians, including survey party, and a force of 150 to 175 laborers. The laborers range in grade from the raw labor, used to cut brush with machetes, transport instruments through difficult country, string lines, cooks and swampers, motorboat and truck drivers, to those who have been trained to handle more exacting tasks.

All this organization must be maintained in field camps and transported to and from work by boat or truck or both. Quarters must be provided for workers and families, and all must be fed and given medical attention. A field hospital must be maintained where workers can receive attention for all types of injuries and sickness, with a doctor on duty at all times.

Supply Problem

Everything in the nature of supplies, from foodstuffs and medicines to dynamite and precision instruments, must be transported from points of supply in cities to the field base of operations. In many cases it is necessary to transport by truck, motorboat and barge, then by dugout canoe, and finally by mule back before supplies reach the point where they are needed. All this makes for extremely expensive operation, and a company must be prepared to pay the price in both money and time. Many United States geophysical companies are operating in both countries under contract to the operators.

Under the present law in Colombia an operator must plan on a period of from seven to 12 years after making application for a concession before his title is established and he is free to drill for oil. After establishing some kind of record of original title to the land he wishes to acquire, giving an accurate survey description so that the boundaries may be defined, and presenting a topographical map, he may apply for concessions not to exceed 50,000 hectares. The new law now under consideration would limit concessions to 25,000 hectares. Provisions have been asked in the new statutes which would make it possible to establish title in a minimum of three years, but under the present system, a preliminary opinion and a final opinion is needed from the Supreme Court, with final approval by Congress. It now takes from four to five years for the first decision, and an additional six or seven years for a final decision. It is possible that this final decision be arrived at within a year or two, but this cannot be relied upon. Permits for geological and geophysical exploration may be requested and received even before the applications for concessions are made.

At loading terminal on north coast of Venezuela, foundations for these 135,000-barrel tanks have been blasted out of the rocky hillsides. This loading point has nine of these tanks.

At the present time, all concession applications in Colombia are being held up, pending passage of new statutes, one of the provisions of which will be limiting of area to 25,000 hectares, and as of August 15, this year, there were 395 such applications being held up with no action taken.

29 Concessions

At the present time there are only 29 concessions actually in force in Colombia, although geophysical work is going on at a rapid pace. Only three of these concessions are in the exploitation stage and account for all of Colombia's production. The remaining 26 are in exploration. Oil has been found on two, but they have no outlet. There has been actual drilling on 24 of the 29 concessions, and one of these, the El Doce concession, held by Shell interests, is scheduled to revert to the nation after the company drilled four dry holes between 1942 and the early part of 1945.

After establishing title to a concession, and receiving permit to commence drilling, there is a primary period of 2½ years after signing of the contract known as the exploration period during which the company has to place at least one rig in operation, with the base exploration period actually three years from signing of contract. The 2½-year limit on spudding time is intended to show intent to develop. Under the proper conditions, in attempting to establish whether or not production found is sufficient to justify the necessary outlay for an outlet for the oil, a three-year extension of exploration time is possible, with a maximum of another three years that, so that the exploration period may run as long as nine years. Extensions must be applied for yearly, under condition that two new wells are drilled each year. The exploration period ends with expiration of the maximum time or with the actual running of oil from the concession, whichever comes first, and exploitation runs for 30 years. During this 30 years a company must figure on realizing on its investment. A ten-year extension to the exploitation period may be secured, but royalty agreements during the ten-year extension must be in accordance with the laws at that time, and may be different from those in force for the original 30-year term.

These particular problems are not so complex in Venezuela, at least as regards time required before drilling on a concession. After making proper application for the concession and signing contract, drilling may commence at once in the event the operators have done enough preliminary work to have picked a location for the well. The whole elapsed time between application and acceptance may be a matter of a few weeks instead of years. However, in the

Type of jungle country in which a number of South American fields are located. Operation here involves clearing and roadbuilding, with a constant struggle against encroaching tropical growth, and careful attention to health of workers.

search for open concessions the new company is confronted with the competition of those who have been in the country for years, with an organization assembled over a period of time and trained in all phases of the industry. Their geophysicists and geologists have been making a study which, combined with actual experience in the field, fits them to give their own companies a tremendous advantage over the new operator.

Prices High

Certain of the newer operators to acquire property in Venezuela have done so at figures considered by the old-timers to be economically unsound. They have paid high bonuses for acreage, and in some cases have given royalty payments so high as to become a cause for question as to whether or not it will be possible to produce oil at a profit even if it is found. No doubt they have done this with full realization of what they were about. They probably have been willing to operate a producing property very close to the economic limit, and charge it off as investment in gathering and training a staff of technicians who, through experience gained while operating the high-priced property, may fit themselves for competing with the older firms. Then, too, there is always the chance that they may be able to pick up proven or partially proven acreage relinquished by companies at the end of the exploration term of the concession. In Venezuela, a company has three years in which to explore its properties, at the end of which it must relinquish at least half of it, which goes back into the national reserve, and is put back up for sale by bids. The original concessionnaire may make his sclection any way he pleases except that it must be in regular units of certain shape. These are usually 500-hectare units, one kilometer wide by five kilometers long, which may be checkerboarded throughout the concession if desired. In this way an operator has been forced to relinquish productive acreage which he has proven by geophysical work and actual drilling. He has the opportunity to buy it back in, but usually outsiders bid highly for such acreage.

Biggest Problem

Having obtained a concession, the operator now faces his biggest problem—supply. In Venezuela or Colombia he is not operating in an area where he can call up a nearby supply house and order parts. He must first establish a warehouse of his own, with stocks for which he cannot afford to wait months. The warehouse stocks must contain more than oil-field supplies. Producers who have been operating in these areas for years have found that inventories of supplies must contain a minimum of about 30,000 items. These include everything from actual oil field drilling and development materials to medical supplies and foodstuffs. On a somewhat smaller scale the same applies to wildcatting. Seldom is a field found near populated centers. Personnel must be recruited under the understanding that they will be taken care of. This means housing and other facilities for 40 to 50 workmen and the inevitable families. Hence, by the time a wildcat is started, there must first be built a community of some 150 or more population. Roads must be constructed and rolling stock provided for moving every pound of material used. This installation is immediately expanded with the finding of production in commercial quantities. Then must be constructed all of the extras, such as schools, churches, commissaries, and recreational facilities. Machine and repair shops are built, with the expensive equipment for their operation, and more often than not the company will have to provide an outlet for his production.

Transportation Hardship

In Colombia, a real problem is posed in the Llanos area, east and southeast of the Andes mountains, where a good portion of that country's exploration is now being centered. Suppose oil is found here. It will have to move through a Colombian port. This necessitates moving the oil over a rugged mountain range. The expense of such a line has been estimated at $100 million on up to two or three times that much, and it is also estimated that it will be necessary to find at least 2 billion barrels of oil in that area to make it worth while building a line. Few companies can afford such an undertaking. Several companies hold exploration acreage in that area, and it would have to be a joint operation. With such an outlay, how long would it take a company to pay out the actual expenses of the line alone, not even considering the ordinary expenses incident to getting properties developed and producing?

Leaving out this extremely difficult area in the calculations, it is said roughly that a company will spend something more than $15 million and most likely twice that much, in one of these countries, before moving a barrel of oil into world markets. Be that as it may, there are few who think that the 5½ billion barrel proved reserve of Venezuela alone is more than a portion of what will eventually be found, and it is still attractive enough to interest many new companies.

Oil in Alaska

Lakes of oil from a seep at Cape Simpson, Alaska. Note the reindeer that perished

A Report on an Expedition to the Far North to Locate Rumored Seeps and Secure Samples

By CAPT. HENRY F. THOMAS
Corps of Engineers, U. S. Army, Inactive

THOUGH petroleum was among the first of useful minerals found in Alaska, it has received relatively little attention. Several years before Drake drilled the first productive well in Pennsylvania in 1859, the Russians discovered indications of oil in the Iniskin Bay area on Cook Inlet, and in 1882 a Russian named Paveloff returned to Russia with a sample of the oil.

About the time the Mid-Continent was being prospected, wildcatting was in progress in three localities in Alaska where seeps were found: on the Alaska Peninsula in the area between Cold and Portage Bays; on Cook Inlet between Chinitna and Iniskin Bays; and in the Controller-Katalla Bay area on the Gulf of Alaska. By 1904 several wells had been drilled in each area, the deepest of which was approximately 1000 feet. The Katalla area seemed to have better prospects than the other two localities, although from a geological point of view it had little to offer. But by 1917 a total of 31 wells had been drilled in the Katalla field, a refinery erected which was to operate until depleted production and competition with refined products shipped from the states compelled its abandonment.

Two Deep Tests

Not again until the late thirties did Alaskan Territory receive any attention from oil operators, then California interests drilled two deep tests on the Peninsula, one in the Chinitna-Iniskin Bays area, and the other farther out on the peninsula in the Cold Bay area. Detailed geologic surveys had been made of these two areas and their tests presumably were located on favorable structures, but both were failures.

The well in the Iniskin Bay area was drilled to 8875 feet in rocks of the Jurassic system without encountering production in commercial quantities. However, it was reported to the writer by the custodian of the equipment still standing on the ground that, after the well had been closed in several days, it would flow about 50 gallons of oil sufficiently light to operate a motor, without refining. This well was drilled on the axis of an anticline on Fitz Creek on the flank of Tonnie Peak. Rotary equipment was used and sufficient material was available on the location to have drilled much deeper. It is reported that interest in that area is still manifested by the same operators.

ALTHOUGH it is not generally known, Captain Henry F. Thomas, consulting engineer, was originator of the Alaskan Oil Expedition, sponsored by the United States Bureau of Mines.

The purpose of the expedition was to locate rumored seeps and, if possible, to secure samples for laboratory tests. Captain Thomas' initial work was an interesting contribution to the knowledge of oil possibilities in the Far North and provided a valuable groundwork for later activities.

Before making the expedition, Captain Thomas conferred with several high-ranking government officials, and was told: "This is the first time I have ever seen any intelligent plans for the future development of Alaska on paper," and "I think you have done more for the future of Alaska than any other man since we bought Alaska."

Location of the party's second camp on the upper reaches of the Colville River. This Eskimo and his average-sized family were very friendly—they caught two bushels of fish for their guests in a few minutes. Pilot Sig Wien and the author, right, are in the background.

The test in the Cold Bay area, north of Wide Bay, was of some magnitude and considerable expensive preparation was necessary preliminary to actual drilling. No little trouble was encountered in landing the heavy equipment from lighters in rough waters and then transporting it several miles inland. This well was drilled by a major company and it is reported to have been approximately 5000 feet deep in hard shale in the Jurassic system without encountering a show of either oil or gas.

Despite the many prolific seeps found in various areas on the peninsula the presence of well-defined structures favorable for accumulation of oil, and the favorable opinion of reputable geologists of those areas as potential producers, the highly metamorphosed condition indicated by the grade of oil found in the Iniskin well together with the proximity of volcanic action to both areas, the writer is inclined to believe that areas in the interior offer greater possibilities, particularly the Arctic Slope.

Attached to the Alaska Defense Command in 1942, my assignment to investigate the Petroleum resources of Alaska, a large order, to be sure, supplied a topic for much idle conversation resulting in derision at the thought that oil could be found in nature's refrigerator.

Much to Learn

Due to the extremely short seasons in Alaska in which field work can be accomplished, particularly in the Arctic, much of the geology of Alaska remains to be determined. Surveys to determine structural features have begun only recently. What geologic information is available is due to the efforts of such geologists as Dr. Phillip S. Smith and Fitzgerald, Leffingwell, Brooks, Moffet and others whose work in the far north was done under hardships. Reports of their findings have been published in bulletins and are available to the public. To those who are interested in learning something of the work accomplished in the Arctic, I would recommend reading Bulletin 797-D, "Surveys in Northwestern Alaska in 1926," and pp 1440-1446, Vol. 25, No. 8, August, 1941, "Bulletin of the American Association of Petroleum Geologists," both by Dr. Smith.

The author, clad in what the properly-dressed Arctic visitor should wear. His apparel includes heavy wool underwear, sweater, leather jacket, two pairs of pants, parka, shoepaks and three pairs of woolen stockings.

Pipe Line Plans

When work began on the Canol Project in Yukon Territory, Canada, to produce, transport and refine oil from a proven field in Fort Norman, it was almost certain that I would not receive a directive to start actual exploration work in Alaska. Therefore, I was assigned to other duties in the construction division of ADC. However, the data obtained on a mission to the University of Alaska and from investigating many rumors of seeps encouraged me to make unofficial plans for development and to plan a pipe line distribution system to serve all of the Alaska mainland by utilizing river transportation. Bulk plants would be constructed on the trunk line at all navigable river crossings. From these points summer shipments could be made as far east as Yukon Territory and as far west as the Bering Sea on the West Coast. It would originate in the Arctic slope and terminate at Valdez on the Gulf of Alaska, which would provide a North Pacific all-year fueling port for naval and commercial vessels.

The proposed line would traverse approximately 650 miles of unsurveyed and undeveloped country from the Cape Simpson area to Fairbanks, from where it could be built along a highway the entire distance to Valdez. To construct this line would require considerable and varied transporting equipment and road-building machines. The line itself could be laid on the surface except when crossing glaciated ice, where suspension supports would have to be constructed. Such a pipe line is entirely feasible.

After discussing my plans with Governor Ernest H. Gruening of Alaska for an Arctic expedition to explore the oil possibilities of far-northern Alaska, I was ordered to headquarters and assigned to special duty with the Governor in connection with the expedition, which was sponsored by the U. S. Bureau of Mines. Members of the expedition included Norman (Duff) Ebbley, U. S. B. M., Harry Joestings of the Territorial Bureau of Mines, and the writer.

The purpose of the expedition was to locate rumored seeps and if possible, secure a sample for laboratory tests.

Using two small planes, one equipped with pontoons, we left Chena Slough in Fairbanks on August 22, 1943, for Bettles, our first stop inside tse Arctic Circle. Bettles is situated on the Koyukuk River and has been a trading post since the early gold rush days. Its normal population today is four whites and a few Indians and Eskimos.

After a few days delay due to weather conditions the expedition was relayed by one plane through the Anaktuvuk Pass

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Dog team and plane at Ruby Alaska, used by Captain Thomas on his second reconnaissance expedition in the Kuskokwim and Yukon River valleys.

in the Brooks Range to our first base camp on the Colville River, about 15 miles south of its confluence with the Anaktuvuk River. It was at this point we discovered three separate seeps of oil and gas. This area is designated in our reports as the Umiat Mountain area. About 1½ miles west of the Umiat Mountain large bubbles of gas were coming from the bottom of the lake which would burst on the surface and leave an oily film on the water, but we found no oil saturating the shore lines. As we approached the lake on foot carrying our rubber boat we could detect an odor of natural gas so strong that it was unmistakable, and each time we lowered a weight to the bottom of the lake to determine its depth its disturbance always brought many more bubbles to the surface.

In another lake just east of this one we found a slow but steady seep of oil and also gas bubbles coming from the bottom of the lake. The sample was a light distillate.

On the river bank south of the lake and near the base of Umiat Mountain, we found the sand and gravel impregnated with oil. All three seeps apparently came from the same source beds. A reversal of dip was also noted in this area.

At this writing it is reported that the Navy is core drilling that area for stratigraphic information.

The other five localities in which we located actual seeps were along or not far from the Arctic coast line, all in the coastal plain, and are as follows: Ungoon Point, near Humphrey Point and about 40 miles west of Demarcation Point, the boundary line of Yukon Territory and Alaska, where we found three separate seeps—pitch beds covering an area approximately 100 x 300 feet in extent; Manning Point on the Arctic shore line about two miles southeast of Barter Island where we found no individual seep but oil impregnated sand and silt and about 1½ miles of the shore line covered with an oily froth; Fish River seep, about 25 miles southwest of the mouth of the Colville River, near the confluence of the Ovolotuk Creek and Fish River, a pitch bed about 6 x 20 feet in extent; Dease Inlet Seep, about a mile east of Doonakavik Cove, a petroleum residue issuing from a mound, a considerable area impregnated with pitch; Cape Simpson Area, where the three most prolific seeps were located and from which samples were taken from the active flows.

Brower's Findings

About 1890, several years after locating on Point Barrow, then a whaling station on the bleak coast of the Arctic Ocean, Charles D. Brower, "King of the Arctic," investigated Eskimo reports of "Ungoon" found on the tundra about 60 air-line miles east of Point Barrow, at Cape Simpson. He was the first to report their existence to the Government, and since then many explorers and Government representatives have examined them, and they were the only ones known until this expedition was made. Incidentally, Point Barrow is not an inhabited place. It is on the northernmost point of a very narrow peninsula which extends about nine miles north from the town of Barrow. Barrow's normal population consists of 11 whites, about 400 Eskimos and about that many howling huskies plus one polar bear.

First Seep

The first seep is about four miles northwest of Cape Simpson and only ¼ mile or less from the Arctic Ocean shore. This proved to be a natural oil

Dating the belles of Bettles, Alaska. Mary, on the author's left, presented him with two jars of wild cranberry jam and a potato to take along north.

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"flow" about 800 feet long and about 200 feet wide and examination of the tundra contiguous to the flow disclosed that about 25 acres were underlain with heavy pitch. The head of the flow was on the slope of a mound. We were able to get a fluid sample of this and it was noted that after bottling, the oil appeared to become even more liquid.

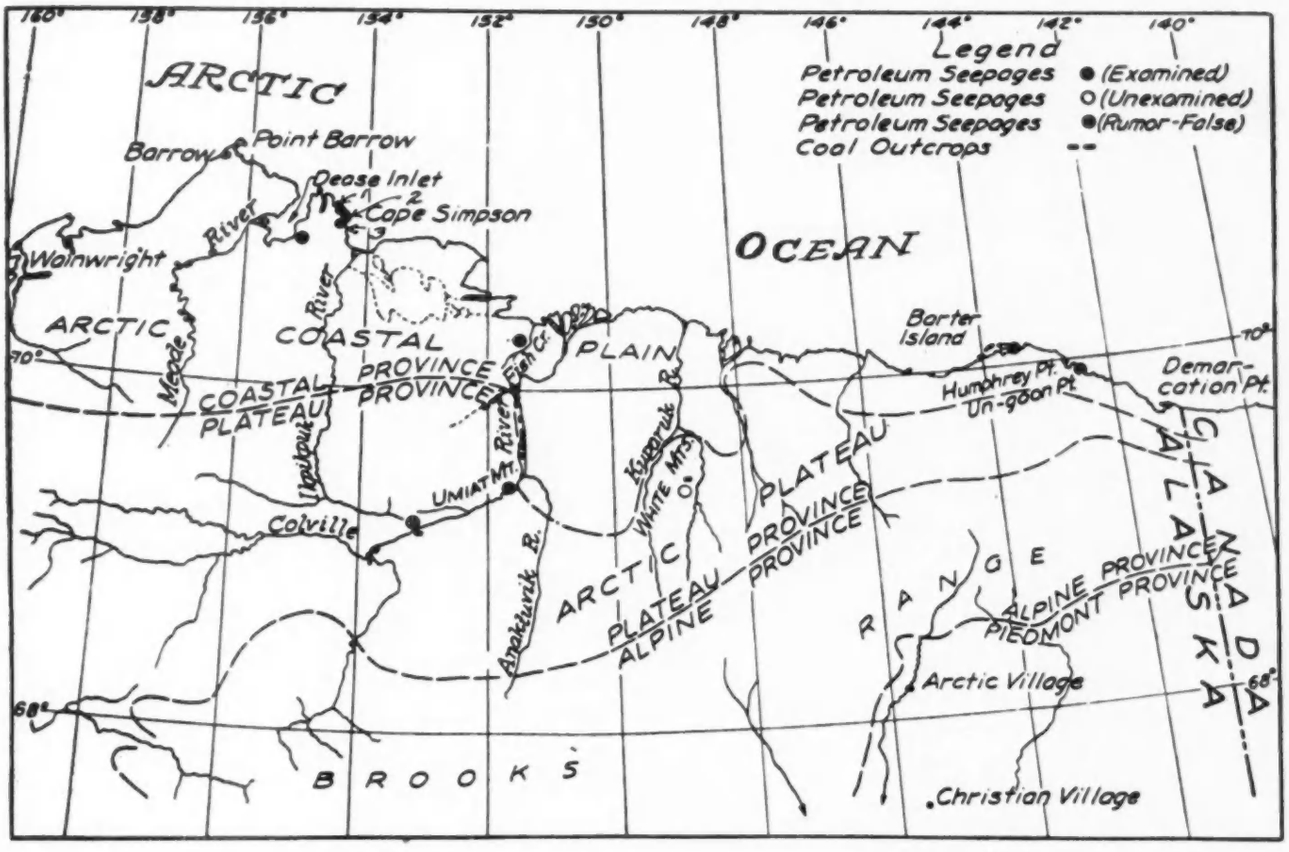
The second seep was found about three miles south of the first, and like the first, its head was located on the slope of a mound. Its flow was about 150 feet wide and about 600 feet long where it accumulated and formed a lake. The area around it, approximately 10 acres in extent, was also underlain with heavy pitch. At this location several reindeer perished in its bog.

The third (unreported) seep was discovered about three miles south of the second and, like the first two, was flowing from a rise on the tundra, and while it was not as large as the other two flows, the pitch-impregnated area covered approximately 20 acres. At this flow were about 300 "bags" filled with the more solid pitch by the natives, who use it as fuel. The natives have been using this residue for many years. They bag it in the summer when the snow and ice have melted and leave it there until travel by dog team is possible.

No one knows how long these flows have been active but the product is sufficiently weathered to indicate that it has been exposed many years, for all of the lighter, volatile constituents have been dissipated.

These 12 separate seeps found in six localities on the slope comprise an area roughly equal to the size of the state of Pennsylvania. The whole area covered by the expedition is roughly 100,000 square miles and it is estimated that we flew approximately 8000 miles. With the exception of the inhabitants in Barrow and a few settlements along the coast, we encountered very few Eskimos in other places in the 100,000 square miles, a fact that greatly surprised all of us.

The Eskimos we met were friendly and curious but shy, and while few



Map of northern Alaska showing localities of petroleum occurrences known at the time of Captain Thomas' expedition.

of them could speak or understand English we usually were able to make ourselves understood.

Great Possibilities

In writing of or discussing the potentialities of the Arctic slope as an oil producing area, one might freely employ the use of the superlatives to try to convey a true picture of its immensity but still the description would be inadequate. A personal investigation leaves the thought that if it were developed it might easily prove to be the largest producing area in North America. Not only the presence of oil on the surface at any particular location, but the number of prolific oil flows which were found over such a large area and the fact that they continue to flow through permanently frozen over-burden, impel one to visualize that area as a large producer. And there are many more areas in the slope which have not been examined for seeps.

Due to lack of exposures on the coastal plain, geologic data are not available nor ever will be available until geophysical work and core drilling yield stratigraphic information. Due to the nature of the tundra during the short seasons in which work can be done, it is unlikely that a seismograph could be employed for that work. A lighter and more compact instrument would be more suitable for transporting by pack. In the plateau and mountain sections of the slope where exposures exist, geologic reconnaissance can be accomplished.

More or perhaps all of the area the expedition examined for seeps is in the Naval Petroleum Reserve. The eastern limit of the preserve established in 1923 during President Harding's administration was the Colville River, but since the expedition it is rumored that the reserve has been extended to include all of the Arctic slope. (Contrary to popular belief, the Arctic slope does not begin at the Arctic Circle, but on the northern slope of the Brooks Range and includes all that land between the Brooks Range and the Arctic Ocean, a land dotted with millions of small lakes and many rivers that run, as Robert Service said "God knows where"—but all of them empty into the Arctic Ocean.)

In addition to the slope, there are other areas not in the Naval Reserve but inside the Arctic Circle and in Central Alaska worthy of attention from the oil industry.

Just inside the Arctic Circle in the vicinity of Fort Yukon near the confluence of the Porcupine and Sheenjek rivers a prolific seep was reported to the writer which appears worthy of investigation since it appears to be in a locality geologically possible for the production of oil.

Year-Round Opportunity

The land in the bend of the Yukon River between Galena and Nulato is particularly interesting and it is in an area where development could be done most of the year, although not without some hardships during the long winter. But having spent two winters in Alaska covering every part of the mainland and the Aleutians, the writer would prefer a frigid climate to a torrid zone infested with insects.

In Southern Alaska the area of Anthracite Ridge in the vicinity of Wasilla near the Matanuska Valley is worthy of investigation. A sample of apparently high-grade oil was shown the writer, supposedly found in a hole which was core drilled for coal. If the carbon content of the coal in that vicinity is not too high, it is entirely possible that it could produce oil. It is in an area which might be considered "possible" territory.

On the accompanying map Dr. Smith has outlined possible areas in which petroleum might be found. Other geologists who reside in Alaska have made a study of Alaska with reference to

"possible" areas, not included in Dr. Smith's outline, which are worthy of investigation.

Arctic Challenge

Developing the petroleum resources of Alaska, particularly the slope, offers a strong challenge to the most intrepid operator of the industry, for the Arctic gives no quarter in summer or winter. It's an all-year battle, but it can be developed. Physical obstacles readily yield to modern methods of engineering.

Methods of transportation in the Arctic vary with the seasons. In the latter part of July and August when temperatures range from 20 to 40 degrees and while the tundra has thawed to some extent, planes offer the only method of travel except by foot. Fuel for planes is a serious problem, since it must be flown in and cached in accessible places for landing. In Central and Southern Alaska there are few roads, one commercial railroad, but many air-routes which fly the year round.

Arctic flying conditions are best in the second quarter of the year and some good flying weather occurs in Octobeer, but clear days are exceptional on the coastal plains. Transportation by dog sled, snowmobile, and tractor is feasible to some extent through the winter but all travel ceases during blizzards when the thermometer goes to 50 degrees or more below zero.

In making an Arctic expedition even in summer one must wear heavy woolen underwear and warm top clothing and should have along a parka for protection against the constant wind. For foot wear to mush over the tundra one should have shoepaks, or if possible, Eskimo water boots which are made of seal skin (hair seal). The Arctic Eskimos are the only people on earth who can make water-tight, handstitched foot wear.

For winter wear the natives use reindeer skins for the fur worn next to the body and a second skin with the fur outside.

At the monument marking the spot where Will Rogers and Wiley Post crashed about 15 miles from Barrow. The memorial was built with materials from Claremore, Okla.

In summer the regulation type eiderdown sleeping bag is sufficient for warmth but in winter the native reindeer or caribou bag is necessary.

An Arctic expedition should have the best food obtainable, food which requires the least amount of preparation and cooking, for there is no fuel in the Arctic except in isolated spots where petroleum is found, and those places are far apart. We used army rations, C, K, and Mountain types. Although fish and fowl are plentiful in some regions it would not be advisable to try to live off the country. After a big-game hunt in the Alaska Range the writer vowed the next one would be in a zoo or in a country that has transportation facilities.

Upon my return from the Arctic expedition and after writing my report in Juneau, I left for the mining area lying between the Yukon and Kuskokwim rivers, this time alone, using chartered planes and dog teams, to make a reconnaissance of the area which should be served by a lateral line of by river transportation down the Yukon from the trunk line indicated on the accompanying map. This mission completed the reconnaissance over the entire pipe line system, and I am satisfied that Alaska can be served just as efficiently as other places.

Before there was a United States of America, when Russians crossed the Bering Strait from Siberia to what is now known as the Seward Peninsula, the westernmost tip of the Alaska mainland, they asked the Eskimos what lay beyond the mountains, and they answered, "Al Ay Eska,' meaning, "Great Country Beyond." To the Russians it sounded like A L A S K A, hence, its name.

Al Ya Eska seems to be an inadequate description of that great country to any one who has treversed it afoot, by dog team, and by plane from its Arctic shores to its Aleutian tip and from the Klondike to the Bering Sea.

The part that Alaska has played in this war, and the extent of its vast wealth of minerals are just now becoming known and appreciated. And once again the Russians are crossing from Siberia to penetrate deeper into the great country beyond the mountains, an indication of direction of travel. Alaska's importance as a strategic air base for world travel can hardly be overestimated, nor can the necessity for immediate and continuous development necessary to maintain its future importance in world trade be over-emphasized.

Although railroads, highways, and air routes are the principal factors in developing a new country, petroleum and its refined products are necessary to sustain it.

The opportunities in Alaska are manifold to those of foresight and courage, for Eastern Asia and Alaska will play an important part in the economy of a world at peace. Trade barriers will be reduced if not obliterated between the western world and the far East, and vastly improved air transports will regularly fly the air lanes radiating from Alaska.

The "whole town" of Bettles, Alaska, on the Koyukuk River, 100 miles south of the Arctic Circle. The expedition's plane is lower left, the store and warehouse in foreground.

Members of the expedition. Left to right, Captain Thomas, Pilot Wien, Norman (Duff) Ebbley, Simon Paneak and Henry R. (Hank) Joesting.

BAKER *Triplex* CEMENTING SHOE

allowing the basket to expand outwardly against the wall of the hole. The cementing operation is then carried out in the conventional manner with all cement slurry directed upward and *held above the shoe* by the expanded Baker Metal Petal Basket.

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All internal parts are made of readily drillable materials. Two one-half inch set screws hold the inner assembly stationary to facilitate drilling out the shoe.

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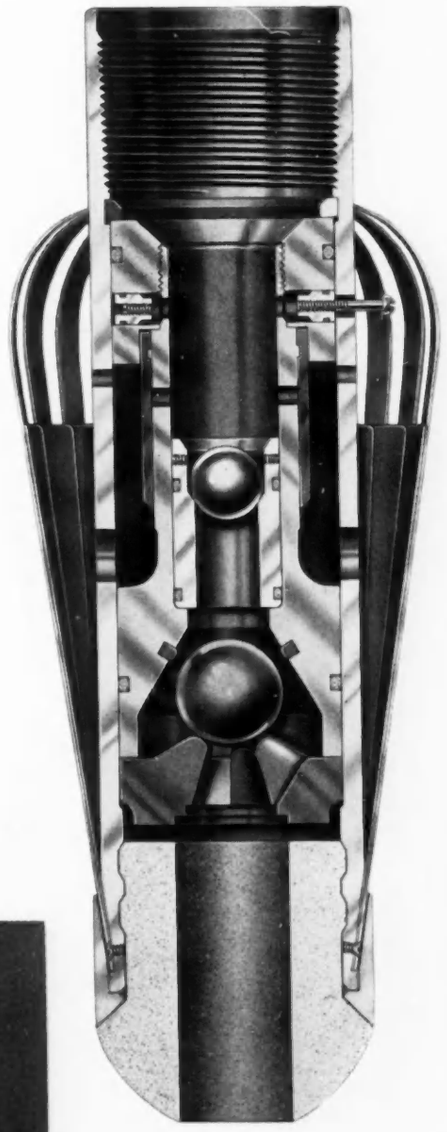
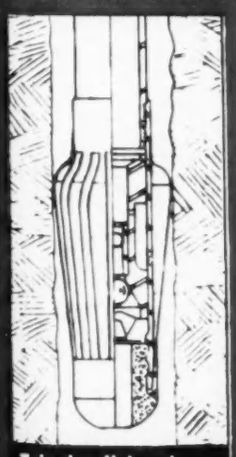
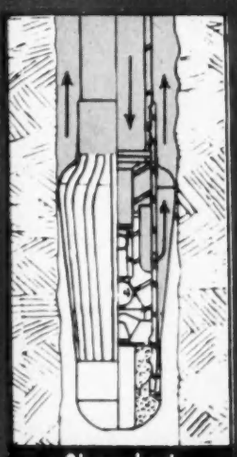


After safely floating in the casing and moving it freely to condition the hole, the tripping ball is gravitated or pumped down, seating on top of the tripping valve. Pressure of 400 to 500 psi then shears the screws in the tripping valve which moves down and exposes the whirler cementing ports. Shearing the screws also releases the Baker Metal Petal Basket which expands against the side-walls and forms a bridge. Or, if the hole is irregular in shape, the Basket packs-off to fill the annular space and hold the cement slurry above the shoe.



Tripping Valve down, Basket expanded



Slurry kept above shoe

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IPAA Reaffirms Its Approval of Proposed Anglo-American Oil Pact

The new Anglo-American oil pact "has been examined line by line" by the Independent Petroleum Association of America and at the recent executive meeting in Shreveport, La., its previous approval was reaffirmed. Expressed objections to the revised version were reviewed at Shreveport but the decision of IPAA was the same as that reached at Tulsa in October, viz., that the agreement should be ratified by the United States Senate "as a constructive step toward protection of our domestic industry from chaos that would be caused by ungoverned exploitation of foreign oil reserves."

Russell B. Brown, general counsel, has analyzed the position of IPAA in the following statement:

"The agreement, which is now before the Senate, provides for the following:

"1. The facilitation of orderly development of international petroleum trade.

"2. The creation of an advisory commission of six members to make continuing studies and recommendations designed to promote such orderly development.

"3. Respect by the signatory nations for valid concession contracts and lawfully acquired rights; non-interference, directly or indirectly with such contracts and rights.

"4. Respect for the principle of equal opportunity in the acquisition of exploration and development rights.

"5. Freedom from restrictions inconsistent with the purposes of the agreement as to exploration for and development of petroleum resources, the construction and operation of refineries and other facilities and the distribution of petroleum.

"The agreement contains the following express limitations and restrictions upon its own operation:

"1. The commission to be named is limited to advisory duties. Neither government is required to act upon any report or recommendation which the commission may make, nor, if approval is given, to require the nationals of either goverrment to comply with any report or proposal.

"2. Nothing in the agreement is to be interpreted as modifying or impairing any law or regulation relating to the importation of petroleum into the country or either government, or to impair or modify the right to enact laws relating to importation.

"3. Either signatory government may withdraw from the agreement on three months' notice.

"Our association views this agreement as a constructive step toward the protection of our domestic industry from the chaos that could be caused by ungoverned expioitation of foreign oil reserves, and recommends ratification. It hopes, however, that the hearings will develop full discussion by those who oppose as well as those who favor the agreement. It is no edict thrust upon us, but a proposal that must undergo the test of discussion and debate. We are glad that those who are in opposition will have equal opportunity to make known their views."

German Automotive Secrets To Be Disclosed at Meet

Conversion of German automotive engineering data, techniques, materials, and progress to the uses of American industry and ultimate service of the American public will be inaugurated at an SAE German Engineering Evaluation Meeting scheduled for March 4 next at Detroit, Mich. General Manager John A. C. Warner, of the Society of Automotive Engineers, has announced the meeting will facilitate public presentation of findings by various American engineering missions studying German automotive developments.

"German automotive engineering progress, which under the Nazis reached its peak in preparation for war, now is being converted to peaceful applications," Warner said. "American automotive engineers and industries now can take advantage of whatever new and satisfactory the Germans developed in the way of designs, materials, and utilization thereof."

Argentine Drops

Production in the Argentine for the 10-month period, January-October 1945, totaled 19,093,716 barrels of petroleum or 5.6 percent less than the 1944 figure for the same period. Of the total 19,093,716 barrels were government and 6,211,658 barrels private production.

France's Production Only One Seventh of Her Needs

France today needs 7 million tons (a little more than 50 million barrels) of oil per year. Through her fourth interest in Iraq Petroleum Corporation and a trickle of local production, she is able to supply about one seventh of her needs. She is, therefore, compelled to buy her oil either from the "sterling block," the United Kingdom; or the "dollar block," the United States and South America.

France is now operating two refineries, the Compagine Francaise de Rafinage at Martigues in South France near Marseille, and Sociate Generale des Huiles de Petrole refinery at Lavera in South France. A third refinery, the Berre refinery, near the Lavera location, is about to reopen. The first two refineries are supplied with Iraq crude and the third will use Caribbean crude.

Radio Geology Now Being Taught in Central Europe

The opening in December of the Department for Geo-Electricity, Applied Radio Engineering and Radio Geology at the College of Technology in Vienna is reported to be the first of its kind to operate in Central Europe since the war. The department is headed by Dr. Fitsch who it credited with having made valuable contributions to geo-electrical measuring methods, especially the so-called "radio-detection" which, an Austrian report says, consists in "geo-electrical sounding" enabling the discovery of oil as well as of water, ores and coal deposits.

The growing importance of Austrian petroleum resources is indicated by a recent report in the Vienna Oesterreichische Zeitung that owing to expanding activities on the Zistersdorf oil fields the number of workers in increasing steadily.

Sakhalin Production for 1945 Nears 5-Million Mark

Soviet oil production on the island of Sakhalin may have reached 4,100,000 barrels or even 4,775,000 barrels during 1945 according to reports published in the Montieur du Petrole Roumain of Bucharest. Before the war the Japanese production on the island varied between 1,700,000 and 2,050,000 barrels annually. The Soviet production on Sakhalin was about 2,050,000 barrels a year.

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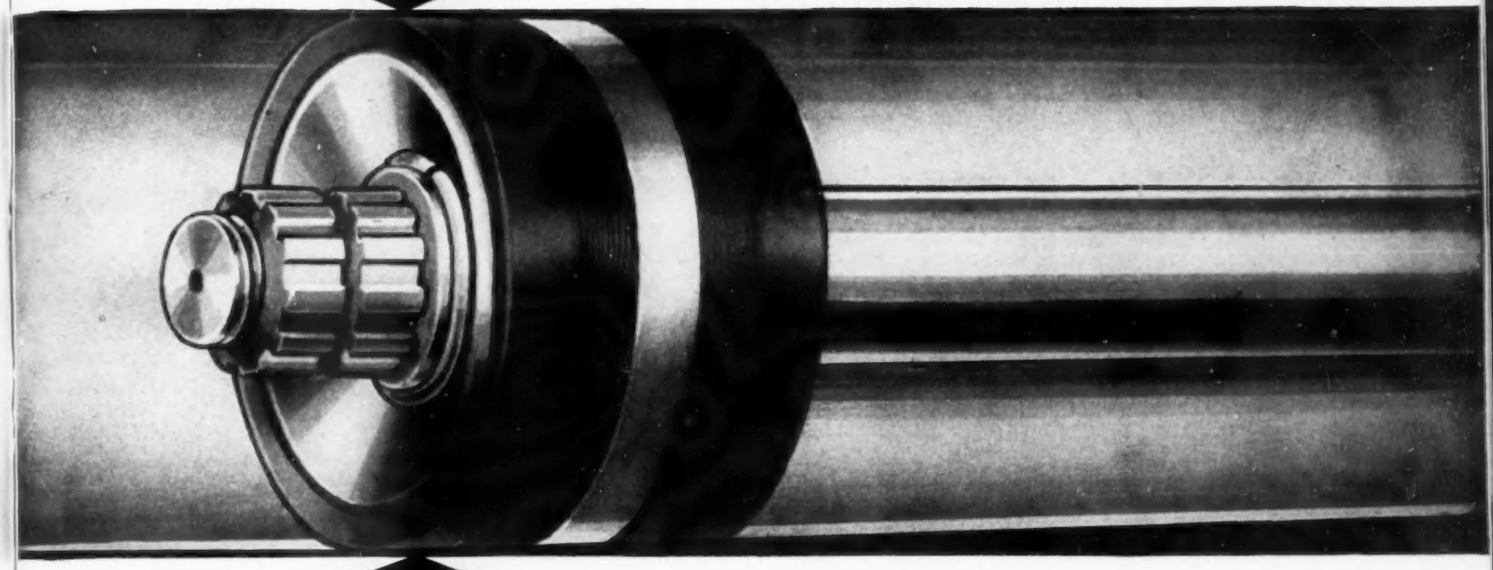

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Advanced design and tougher rubber compound give Mission Piston Rubbers extra long life

Mission piston rubbers are extremely long wearing and trouble-free—that has been proved by operators in every drilling field. And then, after long uninterrupted service, you renew the piston by installing new rubbers without even removing the piston from the rod. And by doing this, you save the cost of the piston body (about half the cost of the entire piston). Proved long life and low replacement cost enables us to guarantee Mission Pistons to be the most economical on the market to operate.

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Export Office, Room 1636, 30 Rockefeller Plaza, New York 20, N. Y.

Personal Notes from Europe

By DR. J. BRIAN EBY

Isaac (Ike) Doughten is doing a good job as Petroleum Attache with the American Embassy in Paris. He was formerly with The Atlantic Refining Company.

* * *

Captain Thornton Beall, formerly with Shell Oil of California for 19 years, was associated with Doughten in the Paris Petroleum Attache's office. As 1945 drew to a close Captain Beall was planning his return to the United States.

Eight hundred thousand homes out of 2 million in the London district have been destroyed or damaged during the war.

* * *

L. Leyds is Chief of Production and Exploration for Dutch Shell in London. Dr. N. S. M. Taverne is chief geologist, A. Van Weelden is geologist in charge of the geophysical department, and Dr. John F. M. DeRaaf and W. F. Stapel are geologists on the Shell staff. During the early part of the war the scientific offices were evacuated from London to the Lensbury Club, Teddington, Middlesex, about 25 miles from the city. Short after, a buzz bomb landed within a few hundred yards of the club.

* * *

Major A. Gunther, former Royal Dutch Shell Company geologist, is in charge of North German oil matters for the British government and has his office at Celle, Germany, about 25 miles north of Hanover.

* * *

The first luxury train in Europe is the newly reinstalled London-Harwich run of the L. N. E. Railway Company, connecting with the channel boat to Hook von Holland, and the Netherlands Railways. This new boat train resumed operations about the middle of November, has individual seats, red carpet and dining car facilities. The two channel boats used during the Dunkirk evacuation have been completely renovated.

* * *

American business men in Paris should apply on arrival to the Visitors' Bureau of the American Embassy for meals and lodging at the Hotel California, in the Rue de Berri. Due to the extreme difficulties of travel and accommodations in Europe at this time and especially in Paris, this is most important to American civilians. These facilities are available at nominal rates, are strictly for temporary use, and cannot be reserved in advance. For American business men in France outside of Paris, the Army will provide billets and meals wherever it has the facilities.

* * *

Marcel Schlumberger, one of the founders and President of Societe Prospection Electrique, maintains his companies' offices at No. 42, St. Dominique Street, Paris VII. This Societe handles all the Schlumberger activities in France. The Schlumberger Overseas Corporation, with offices in Caracas, Venezuela, and Houston, has all the world for its territory except United States and South America.

* * *

Major C. R. Rumazza is head of the Berlin Visitors Bureau and is capably assisted by Lieutenants Ragala, Wills and Elizabeth Fuller, the latter a former secretary for one of the major oil companies in New York City. They are doing a fine job both for visiting officers, enlisted men, and civilians who go to Berlin on official business.

* * *

The general offices of the Seismos Company in Hannover were destroyed in October 1943 by an Allied air raid. It is reported that the company established temporary headquarters in a small town in the Hartz Mountains awaiting the end of the war.

New Guinea Exploration Waits Government Approval

Government approval is awaited for revival of oil exploration in New Guinea. Operations in this area ceased in February, 1942, but drilling machinery and equipment have been preserved and are available. When operations were halted, one test had reached 5000 feet.

American interests through F. Cooper of Melbourne are reported to have paid $406,250 for an option on the Edie Creek gold interests of the New Guinea Gold & Petroleum Development Company. The New Guinea firm intends to use the money in oil exploration and has already applied for necessary permits from the Australian government.

British to Train Technical Men for Management Posts

Advancement of technologists into positions of management is being given serious consideration in Great Britain, The Petroleum Times declared recently.

Findings of the Percy Special Committee, appointed by the British Ministry of Education in April, 1944 reveals the gravity of a situation where there is a critical lack of properly trained technologists.

The report titled "Higher Technological Education" reveals two significant bases of deficiencies in the following warning:

"The position of Great Britain as a leading industrial nation is being endangered by a failure to secure the fullest possible application of science to industry, and this failure is partly due to deficiencies in education. The industrial demand for such men will increase in quantity.

"The experience of war has shown that the greatest deficiency in British industry is the shortage of scientists and technologists who can also administer and organize, and can apply the results of research to development."

Special emphasis on management studies is recommended by the Percy Committee for training in engineering industry of (1) senior administrators; (2) engineer scientists and development engineers; and (3) engineer managers (design, manufacture, operation and sales).

Italian Group's Interest Taken Over by Albania

The Albanian government has taken over control of all the properties of the Italian group. Azienda Generale Italiana Petroli (AGIP), which held a monopoly of the production of oil in Albania, according to the Moniteur du Petrole Roumain, published in Bucharest, Roumania. The prospecting rights held by AGIP in Albania covered approximately 2,978,000 acres.

Colombia Production

Production of crude petroleum in Colombia during the third quarter of 1945 totaled 6,141,000 barrels, compared with 5,864,000 barrels in the second quarter. The nation's output of crude oil in the first nine months of 1945 declined from 17 million to 16,800,000 barrels.

U. S. Navy Seeking More British Oil at Abadan

PAW has initiated negotiations with the British Petroleum Board for the British to make available a larger quantity of Navy residual oil at Abadan for use by the United States Navy in the Pacific. Deputy Petroleum Administrator Ralph K. Davies has conferred with Victor Butler, British petroleum representative in Washington, and is awaiting word as to London's decision whether more oil can be expected.

The British, chiefly through Anglo-Iranian, have been releasing for U. S. Navy use increased amounts of oil, both from their Abadan refinery and out of Admiralty storage. In addition, the Navy has been buying from other sources, including Arabian-American. However, additional Navy requirements announced after the PAW survey of last November, make it imperative, in the opinion of the Army and Navy Petroleum Board, that the U. S. fleet obtain more British oil. Davies' intervention followed the disclosure of the Navy's newest requirements.

Other programs are being developed to supply Navy need. Tankcar movements have been resumed out of the Rocky Mountain area to San Francisco and Seattle. However, movements from the East Coast through the Panama Canal have been virtually halted recently because of Atlantic Seaboard needs.

PAW understands that tankers are available around Persian Gulf points to supply the U. S. Pacific Fleet at its Philippine and Saipan bases. It is hoped that such Abadan-to-the-Pacific movement would also ease the East Coast squeeze by allowing greater freedom of import from Venezuela to Atlantic Coast ports.

To help relieve the East Coast pinch, the Navy already has released large quantities of oil at Aruba for use on the East Coast, and has reduced Atlantic liftings in accordance with PAW recommendations.

Foreign Firms Approved As Penn Grade Members

Several foreign companies have applied for and been approved as members of Pennsylvania Grade Crude Oil Association. The new members are William T. Knott Co., Inc., of New York, Delta Petroleum Co., Inc., of Memphis; Maurice Jennings Pty., Ltd., Sydney, Australia, and Eduardo Osorio, Puebla, Mexico.

Among the memberships renewed for 1946 were three companies in Stockholm, Sweden, and one each in Antwerp, Belgium; Basle, Switzerland, and London, England.

W. Floyd Clinger of Warren, association president, has appointed as additional members of the budget committee, D. T. Ring of Preston Oil Company, Columbus, Ohio, and G. W. Holbrook of Bradley Producing Corporation, Wellsville, N. Y.

Apex Tells of Increased Oil Activity in Trinidad

Increased activity in the oil fields of Trinidad is noted in the annual report of the Apex Oilfields Ltd., a British company.

In his annual statement, Malcolm Maclachlan, chairman and joint managing director, declared that total oil production in Trinidad for 1944, the last year of published figures, was approximately 21½ million barrels to which the Apex Company had contributed about 17 per cent.

Maclachlan also cited the war-time cooperation between industry and both the American and British government. Purchases of oil field equipment are being made from Great Britain at prices slightly higher than those prevailing during the war when the equipment was purchased from the United States, he said.

The company reported that it had drilled a total of 71,000 feet during the war with operations centered mostly in proven areas.

Foreign War Loss Claims Must Be Filed This Year

Individuals and corporations who suffered foreign war losses in 1941 or 1942 have been given until December 31, 1946, in which to file claims in order to obtain tax refunds or reductions.

A bill providing for an extension of time was signed at the year-end by President Truman, making possible the consideration of a revision of the 1942 act dealing with such losses when tax legislation is taken up this year.

Until the new act was adopted there was a three-year statute of limitations on the filing of claims involving 1941 or 1942 losses. The extension of time will be of vital importance to concerns which were unable to file proper claims within the original time limit.

Betancourt Says 1943 Oil Laws of County to Be Kept

Dispatches from Caracas last week stated that President Romulo Betancourt had pledged that the Venezuelan revolutionary government would respect the 1943 law granting oil concessions to foreign companies and that there would be no further taxes on capital. Betancourt denied that his government planned to contest oil legislation approved when Medina was president.

It is assumed that Betancourt's pledge of no further taxes on capital would not affect the decree reported in THE OIL WEEKLY January 7 fixing a new excess profits tax of from 6 to 20 percent on all corporations and individuals whose profits for the year exceeded $225,000. By it most oil companies would pay 20 percent.

Austria's Production Due To Take Tumble This Year

Crude oil production in Austria, which rose from 816 barrels in 1932 to 9,758,000 barrels in 1944, will drop off sharply for the year 1946. It is estimated that only about 5 million barrels will be produced this year.

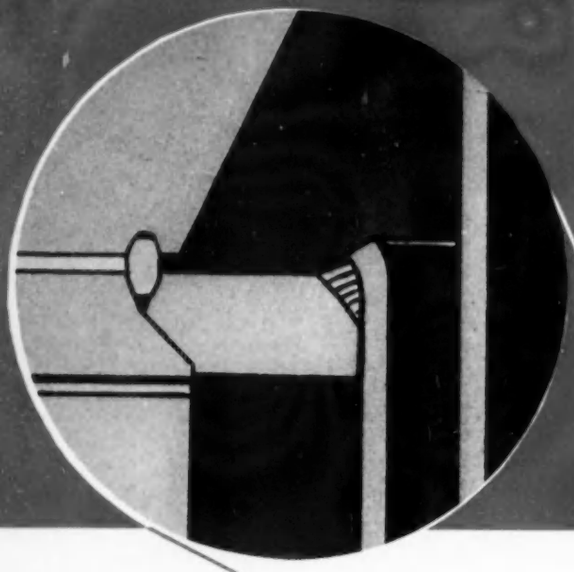
Nitroglycerine Experiment In Canada Is Delayed

A proposed test to set off 5000 quarts of nitroglycerine in a depleted Turner Valley well has been postponed because of extreme weather conditions in Canada and the necessity for further adjustments on the equipment. The experiment now is expected in the early part of February.

This new method, mentioned in a field report in THE OIL WEEKLY December 17, has been patented by Oil Well Reflow Ltd. of Calgary, Alberta, Canada. It involves exploding the nitro after pumping it into the Madison limestone producing formation of the well.

Carbon Black Production

Louisiana produced more channel-type carbon black but less furnace-type black in 1945 than in 1944, the State Conservation Department announced. Channel black production last year was 92,405,700 pounds, from 15,804,872 MCF of gas, as against 1944 production of 75,023,312 pounds from 13,997,449 MCF. Production of furnace-type black in 1945 totaled 73,439,033 pounds, from 6,854,709 MCF, compared with 84,451,150 pounds in 1944 from 7,463,334 MCF.



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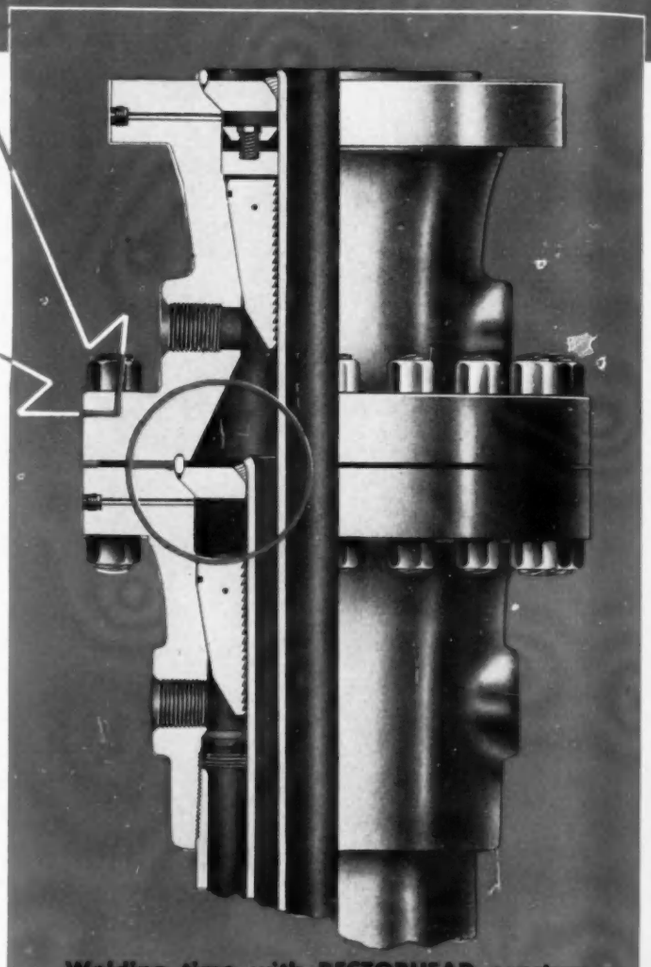

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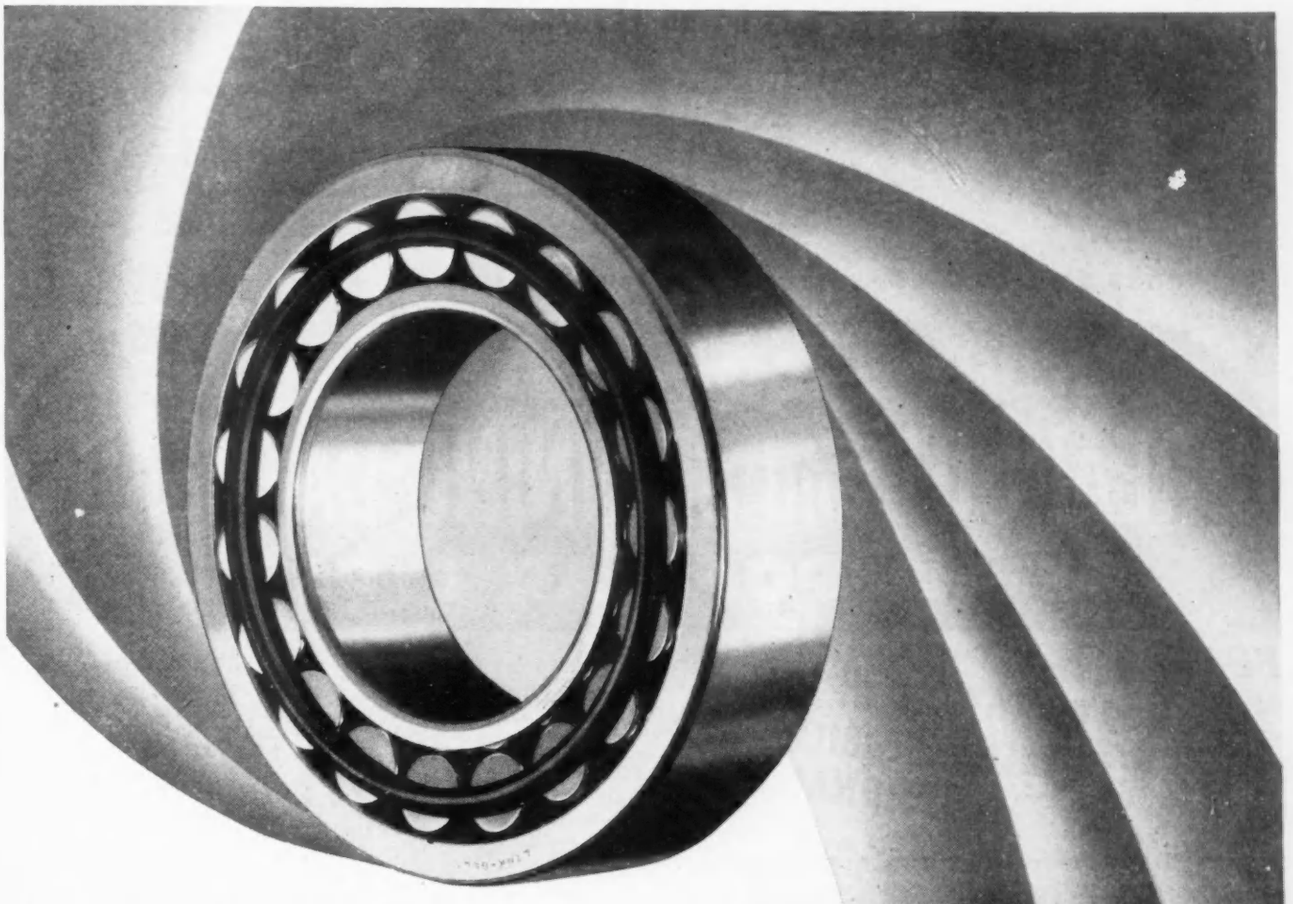

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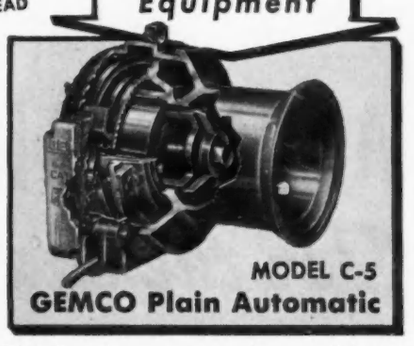

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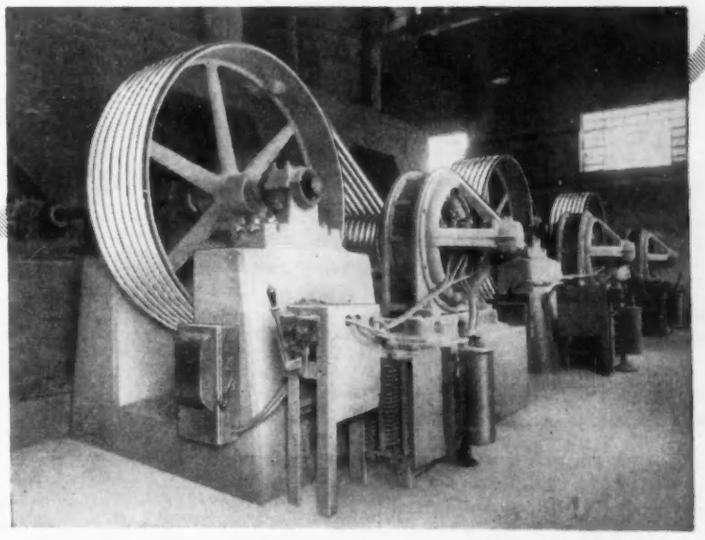

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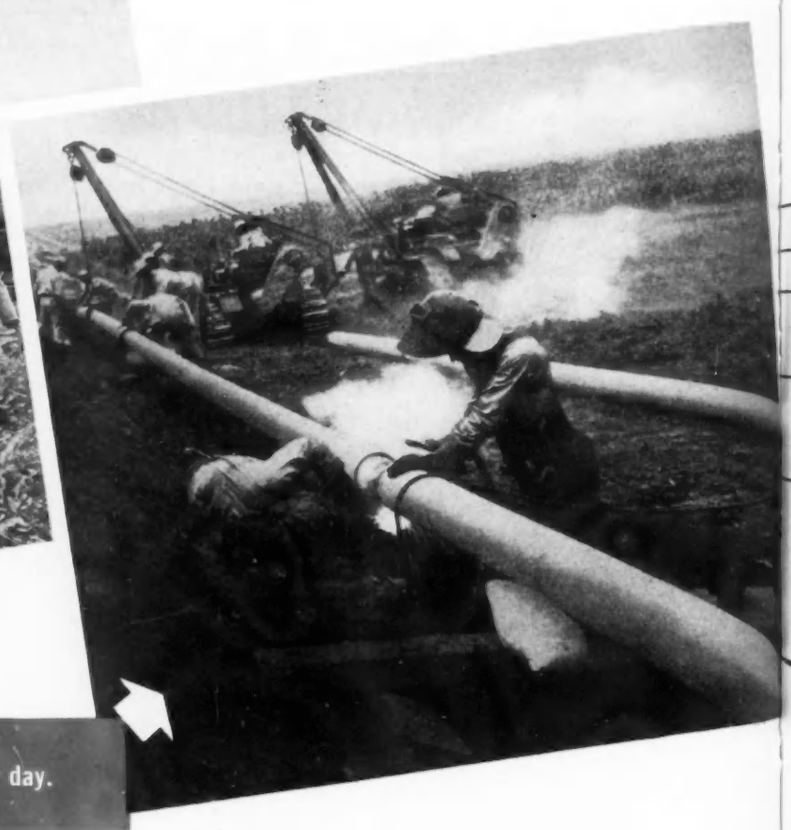

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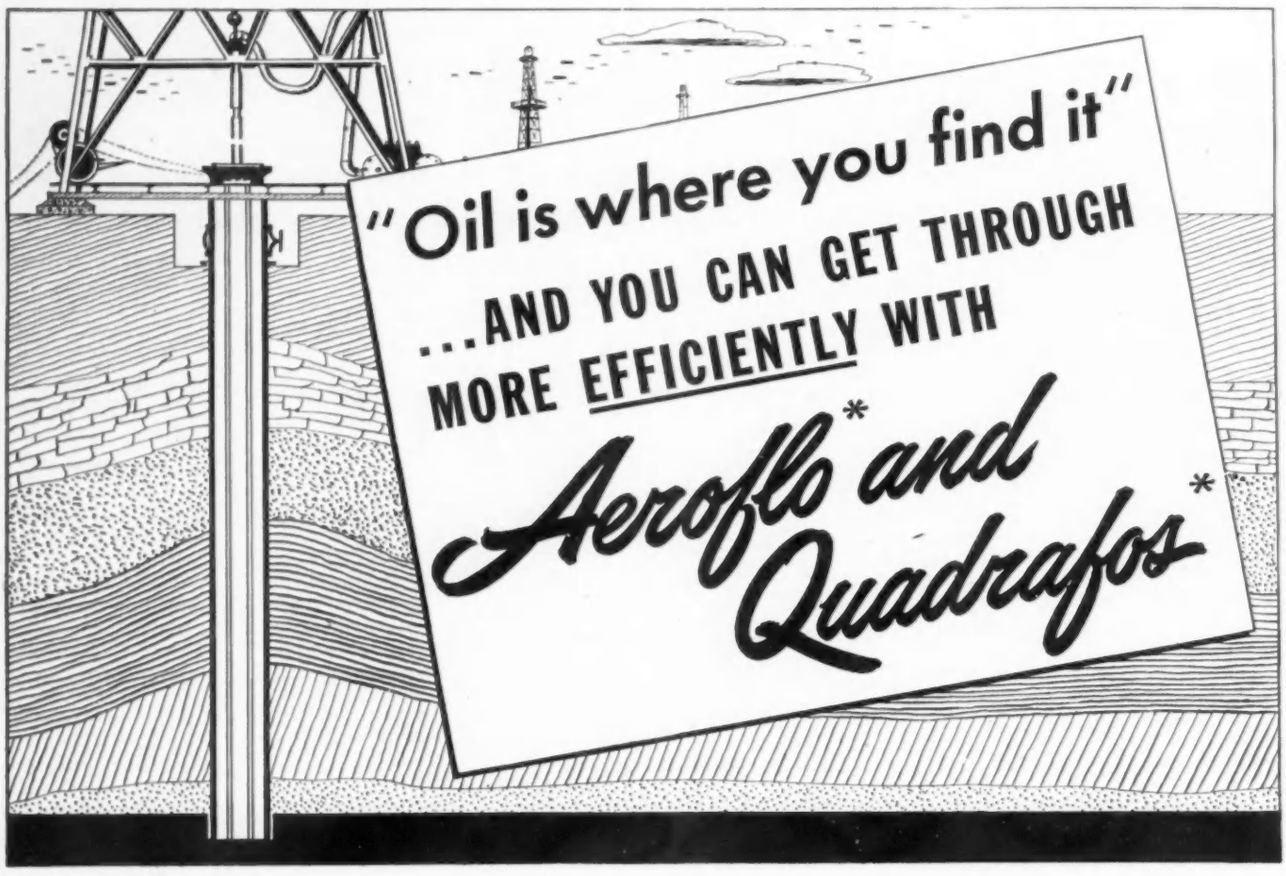

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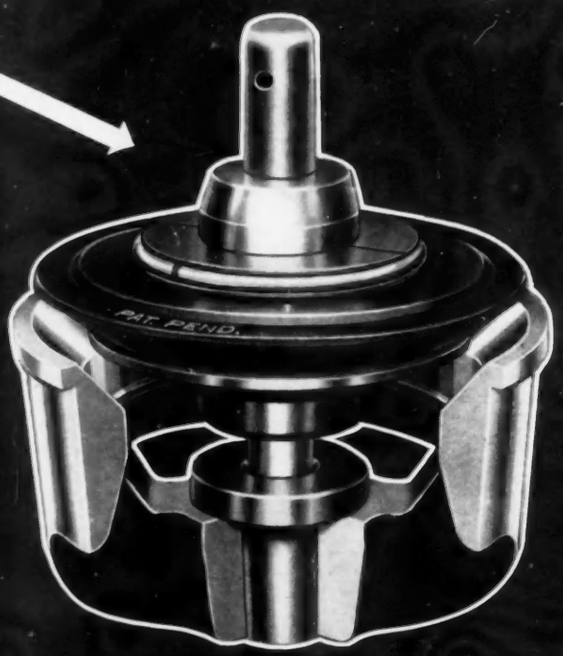

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